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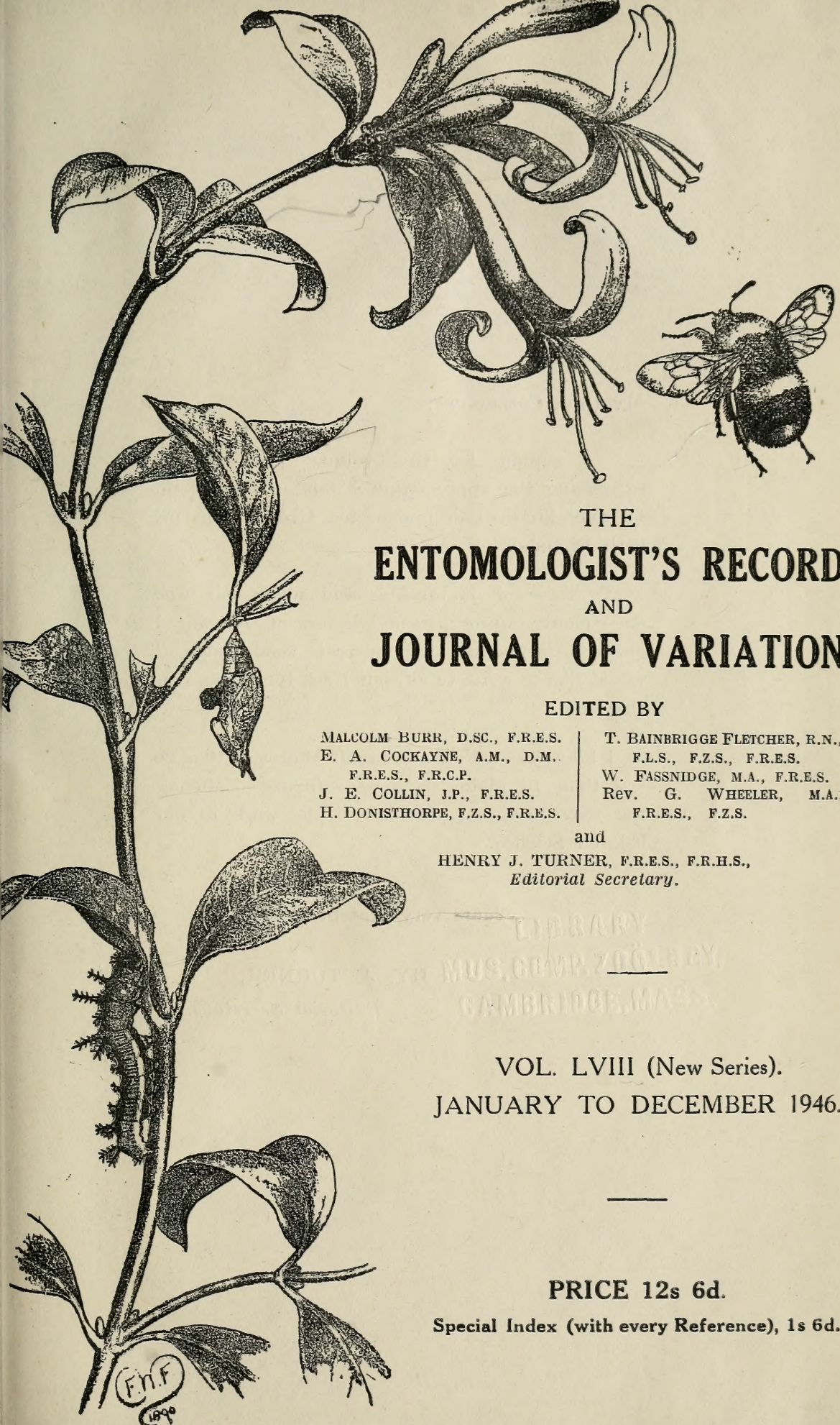
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THE  
**ENTOMOLOGIST'S RECORD**  
AND  
**JOURNAL OF VARIATION**

EDITED BY

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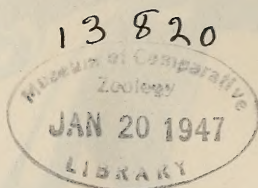
HENRY J. TURNER, F.R.E.S., F.R.H.S.,  
*Editorial Secretary.*

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MY DEAR COLLEAGUES,

I cannot let this volume pass without expressing the appreciation I felt at the receipt of your kindly and unexpected Greeting on my 90th Birthday.

To those of our friends and subscribers who subsequently wrote personal letters of Greeting I am also deeply indebted for their good wishes; I would like to write to all, but I ask forgiveness for the lapse.

I take it as a Greeting to our Magazine that no less than 19 plates have been furnished during the year 1946, as gifts to aid the work in our beloved Science.

Yours very gratefully,

HY. J. TURNER,

*Editorial Secretary.*

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# ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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EDITED with the assistance of

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By HENRY J. TURNER, F.R.E.S., F.R.H.S., *Editorial Secretary.*

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# The Entomologist's Record

AND

## Journal of Variation

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15TH JANUARY 1946

No. 1

We are in the hope of enlarging each number and giving our Subscribers as much matter as in pre-war times, i.e., 20 pp. in place of the present 16 pp.

Will every one aid us in this, please? Let the advance be mutual.

We already have 5 plates in hand for reproduction and numerous articles also in hand with a number of promises. Notes, Notes, Notes, both Collecting Notes for other collectors and Current Notes of general entomological news interesting to those whose entomological work goes beyond the thing of beauty or rarity.

Entomologists who have had experiences abroad could give us their remarks or records. What happened in the occupied countries to the public collections? Already we have had a communication from Holland. One of the most interesting accounts was read by the Registrar of the Royal Entomological Society of London of the happenings to the Natural History Collections of Berlin and other great cities of Germany, which he had personally visited. Our correspondent, E. P. Wiltshire, who was in the Near East, has already given us some of the results of the entomological work which took up his spare time from the work at the British Embassy.

Our Colleague, the Orthopterist, Dr Malcolm Burr at Ankara, has used his small amount of spare time to send us short, but very attractive, notes and experiences in and about the Dardanelles.

May we wish all our readers a Happy and Prosperous New Year, after the five years of repressed entomological opportunities and energies.

HY. J. TURNER (Acting Editor).

### LEPIDOPTERA OF SUSSEX AND WEST HANTS, 1945.

By Commander G. W. HARPER, R.N.

The splendid quantity and quality of migrant and vagrant Lepidoptera reaching this country this year have been well recorded; my general experiences of the season may perhaps form an interesting frame to these startling records.

Climatically the year was marked by intense and prolonged cold in January; mild and sunny February, March and early April; cold snaps at the end of April, early May, and end of May; the summer as a whole was again sunless and cool in the South, though not quite as bad as 1944. August was particularly cold and sunless, September not much better, but October and early November at last brought hot sunny weather.

My diary shows that the early warm spring weather brought many species out two to three weeks in advance of their usual dates, and that



the equally abnormal warmth of autumn prolonged the flight of many species, particularly the multi-brooded species which produced an extra brood. High summer, on the few sunny days, showed a certain patchiness in the distribution of the usually common woodland butterflies, which abounded in some woods and seemed absent in others. Common moths seemed about average, with a similar marked tendency to late autumn emergence as occurred with the butterflies.

MARCH.—*Xylocampa areola* appeared on 7th, and on 8th *Brephos parthenias* was flying about the birches in good numbers; *Aglais urticae*, *Nymphalis io*, and *Polygonia c-album* were also on the wing, but I did not see *Gonepteryx rhamni* until the 22nd.

APRIL.—On the 8th I saw several *Euchloë cardamines*, *Lycaenopsis argiolus*, *Pieris rapae* and *P. napi*. It was interesting to observe that *L. argiolus* has further increased its numbers in this district this year, and at least three broods materialized. By 12th *Syrichthus malvae*, and *Ematurga atomaria* ♂♂ were flying, while the number of hibernating Vanessids had markedly increased. On 15th *Pararge aegeria* was abundant in the woods, and on the same day I captured in bright sunshine a *Phragmatobia fuliginosa*, whilst nightingales and cuckoos were beginning to become vocal. On 21st duty took me to Scotland, and a note on the Aviemore district between 21st and 26th is of interest in contrast to the South. On 21st I was delighted to find my first *Endromis versicolor*, a beautiful pair "in cop." on the trunk of a large birch tree. I saw no others, and Baron de Worms has recorded that the insect was well on the wing by the end of March in this locality. *Nothopteryx carpinata* was everywhere on fences, and *Isturgia carbonaria* was flying in the brief intervals of sunshine at 700 feet level on the heather. On 23rd *Cleora cinctaria* was abundant locally, and on 26th I captured one *Anarta cordigera* also at 700 feet level.

MAY.—On the 1st *Argynnis euphrosyne*, *Leptidia* (*Leucophasia*) *sinapis*, and *Pararge megera* were well out, both sexes flying freely in sheltered spots, the weather being cold. The usual early Geometers were common on tree trunks. On the 7th the weather turned warm at last; *Hammaris lucina*, *Polyommatus icarus*, *Heodes phlaeas*, and *Lycaenopsis argiolus* were abundant on the South Downs, while the bushes were teeming with the early common Geometers, and hosts of larvae of the later summer ones. Most of these turned out to be parasitized, largely by Diptera. The Smerinthine Hawk-Moths were well out by the 8th, for I had the delightful experience of being woken up at 0300 (3 a.m. D.S.T.) by two male *Smerinthus ocellatus* which invaded my bedroom to assemble to a bred female which had emerged the night before. I also found *Sphinx ligustri* wild on this date, the earliest that I have done so.

The 11th was a red-letter day, on which I at last was successful in finding a larva of *A. iris*; it was in its last instar, very handsome, and pupated precisely seven days later; a fine male butterfly emerged after 19 days in pupa on 7th June. This remarkably early date is worth recording, since the larva was practically mature when I found it, and the time in pupa was somewhat longer than F. W. Frohawk and Richard South state to be usual.

An interesting observation from my note book is worth mentioning here; I obtained a large number of larvae towards the end of May,



Geometrid, Bombycid, and Noctuid; I found that the most parasitized were the procryptic larvae, the "sticks"; the hairy but aposematic *Malacosoma neustria*, and *Trichiura crataegi* came next, whilst the very abundant and conspicuous *Eupisema coerulescephala* were completely immune, producing a fine emergence in the autumn.

On the 18th, as mentioned above, *A. iris* larva pupated whilst on the same day I found several larvae of *Limenitis camilla*, not yet mature, and which did not pupate until a week to ten days later; yet this is generally an earlier butterfly than *A. iris* and has been recorded as early as 21st of May.

On the 21st males of *Argynnis selene* were flying in the woods, and *Hemaris fuciformis* was abundant at woodland flowers in the glades, whilst *Aricia agestis*, *Thecla rubi*, and *Zygaena trifolii* were abundant locally on the Downs. *Polyommatus* (*Lysandra*) *bellargus*, *Cupido minimus*, and *Procris statice* were not encountered until the 25th. On the 28th larvae of *Thecla betulae* of very varying sizes were found, producing butterflies between 12th-22nd July.

JUNE.—The weather became even colder, rather wet, and with very few sunny intervals until 20th, which I recorded in my note-book as the first real summer day! Perhaps in consequence of this cold weather the only migrant I found on valerian and other flowers early in the month was *Plusia gamma*, but the latter were numerous, and resulted in a great profusion later in the year. On the 9th I had to go to Gloucestershire, and on the Cotswolds I found male *Maniola jurtina* and *Zygaena filipendulae* on the wing, together with fresh females of *P.* (*Lysandra*) *bellargus*. On the 17th the reason for the sickly appearance of a row of poplars in my garden became suddenly apparent, with a large emergence in the morning of *Sphecia bembeciformis*; the food-plant is unusual, but according to Captain R. A. Jackson, R.N., the usual date, unlike most other species which at this date were still a week or two early. It was interesting to observe this dramatically mimetic moth drying its wings, mating, and flying about the poplars. Before the wings were dry enough for flight the insect when disturbed pretends to "sting" the poplar twig on which it rests, vibrates its antennae in Hymenopterous fashion, and its flight is swift and Hornet-like. Yet a few days later all these artifices were of no avail to one *S. bembeciformis*, for my wife saw a thrush devouring it with obvious relish.

On the 20th *Argynnis cydippe* was flying in the woods, later than last year; I think that the cold and dull weather in May and early June reduced the earliness of species after midsummer. On the 23rd *Polygonia c-album* was emerging; also *Zygaena lonicerae*. The last week of the month saw *Limenitis camilla* well out, and *Argynnis cydippe*, with *Argynnis paphia* close behind; but it was most noticeable that these three species were almost absent from many of their usual haunts whilst swarming abnormally in others. Meanwhile on the Downs *Satyrus galathea*, males, were flying freely on the 26th, as also were *Argynnis aglaia*, but *Procris globulariae*, though locally abundant, was getting worn. On the 30th sugar was productive of *Catocala promissa*, *Mythimna turca*, *Parastichtis suspecta*, *Cosmia trapezina*, and many others.

JULY.—The weather was of a mixed nature this month—some sunny days, rain, and cloud. I saw an *A. iris* male sailing around an ash

tree on 6th, and I missed another splendid one on 8th at 1100 D.S.T. sitting with wings erect on the edge of a cattle pool. *Aphantopus hyperantus* was very plentiful by this date, and males of *Maniola tithonus* were appearing, together with second broods of *Lycaenopsis argiolus*, and *Pieris napi*; the two latter, *Vanessa atalanta* and *Polygonia c-album* all enjoyed moist mud as much as *A. iris*, and this particular pool was distinctly reminiscent of equatorial Africa!

I did not find sugar attractive from this time onwards, perhaps due to the prevalence of honeydew; but one unusual visitor I recorded was an adult Tettigoniid. As the year waned, however, artificial light became more and more attractive, and it was pleasant to observe this after the enforced absence of it due to the black-out.

On the 12th *Thecla quercus* was emerging, while on the 13th came the first indication of the great migrant activity; a fine female *Colias hyale* being missed on the Downs, where *Pyrameis cardui*, and *Eumenis semele* were emerging, mostly males. *Polyommatus (Lysandra) coridon* was well out, an unusually high proportion of dwarfs and cripples being present on the South Downs. This insect was in profusion in its various localities by the end of the month, and lasting rather less time than usual, only a few stragglers being fresh in early September. On the 14th my son, aged nine, took a *Nymphalis polychloros* on *Buddleia globosa*, where it was sleepily feeding. This insect was not entirely fresh, and may have been a migrant.

On the 21st, the clover fields were alive with an immense swarm of *Pieris brassicae*, the density being so great as to be like a snow-storm. On this day I saw a *Pontia daplidice* on a thistle, but was not so fortunate as to see any later. The bullrushes contained a good complement of larvae and pupae of *Nonagria sparganii* and *N. typhae*, but the former I found to be 80% parasitized by a Hymenopteron. On the 28th *Colias hyale* summer brood was appearing in clover and lucerne fields, and although some were probably migrants, it was possible to distinguish clearly two summer broods here; I captured perfectly fresh and heavy-flying specimens at the end of this month, and again on 30th September, whilst the last ones were seen and captured as late as 14th October. *Colias croceus* was moderately common, and produced the usual succession of broods, a perfectly fresh specimen being captured as late as 9th November!

AUGUST.—A stormy month, with fine cloudy periods, and little sun; on the rare sunny occasions, the clover fields were productive of many species, including an occasional *Colias hyale*, while moths increased steadily; *Macroglossum stellatarum* was present in some numbers, while *Amathes c-nigrum* was in profusion, as also at light in the evenings. On the 13th *Catocala nupta* appeared on telegraph poles, continuing well into October, while *Pyrameis cardui* and *Aglais urticae* began to swarm in the clover fields. The Common Noctuids and Geometrids were abundant at street lamps and lighted windows, with an occasional *Pterostoma palpina*. Two Smerinthine Hawk-moths produced at least partial second broods this year; second instar larvae of *Laotoë populi* were found on 21st, while a few *Smerinthus ocellatus*, kept cool in captivity, emerged from 11th to 13th. On 24th *Herse convolvuli* was brought to me, and three more in September, all worn migrants; on 27th and 31st I found three fresh *Heliothis peltigera*, clearly second



brood, in a clover field, but the numbers did not fulfil earlier hopes engendered by the reports of large numbers of larvae found. Two butterflies produced small second broods early in August, *Cupido minimus* and *Erynnis tages*, but I was unable to seek out *Argynnis selene*, which might have been expected to do likewise.

SEPTEMBER.—The weather continued cool, cloudy, and stormy, and not until 29th did the "Indian summer" arrive. A plentiful brood of *Plusia gamma* emerged early in the month. The large numbers of *Pieris brassicae* larvae resulting from the immigrant swarms of July were pupating about the 12th; notable were the very high percentage parasitized by *Apanteles glomeratus*, and also the great distances, up to 100 yards from the nearest foodplant, that many of them wandered before pupating. On the rare sunny occasions, *Macroglossum stellatarum*, *Vanessa atalanta*, *Pyrameis cardui*, *Aglais urticae* and *Nymphalis io* were abundant on the autumn flowers and in the clover fields, with a good sprinkling of *Polygonia c-album* and *Colias croceus*, and an occasional *Colias hyale*. The end of the month was notable for emergencies of *Agrotis segetum* and *Triphaena comes*; one of each was captured on 29th and 30th respectively.

OCTOBER.—The first three weeks were hot and sunny, the best continuous weather since early April. On 20th the spell ended, and a series of record south-westerly gales lasted for a week, followed by a resumption of warm sunny weather. *Plusia gamma* increased in numbers till it was in great profusion—a rough estimate of one clover field I made to be a density of 1000 per acre! A considerable number of *Pieris brassicae*, offspring of the July migrants, emerged early this month, in spite of the high degree of parasitization. The autumn moths began to appear, specimens of the following all being taken in the first week:—*Gortyna flavago*, *Scoliopteryx libatrix*, *Oporinia dilutata*, and *Agrochola lychnidis*. The second week saw *Graptolitha ornithopus* abundant on tree trunks and fences, and *Orgyia antiqua* freshly emerged and enjoying the sunshine, whilst on 25th *Xanthorrhoe spadicearia* made an unusual appearance so late in the year. On 14th I took three *Colias hyale*, the last, while on 15th a thin fourth brood of *Heodes phlaeas* appeared. 17th was a red-letter day, a worn female *Argynnis lathonia* being captured; she had laid her ova, but search of the foodplant, *Viola tricolor*, was not successful. On 27th *Poecilocampa populi* appeared.

NOVEMBER.—The weather continued warm, fine, and sunny throughout the month, but with cold winds on some days, and temperatures falling on some nights near freezing point. Street lamps and road signs proved very attractive to moths; the first week *Colotois pennaria* was abundant, followed by *Erannis aurantiaria* and *E. defoliaria* in large numbers; *Poecilocampa populi* was also common, and one *Brachyonychia sphinx* turned up on 9th, on which day the last *Colias croceus* was captured.

At the time of writing *Operophtera brumata* is occurring commonly, whilst *O. fagata* is locally abundant in birch woods (25th November).

Thus a most interesting year is drawing to a close, characterized by remarkable quantity and quality of immigrant Lepidoptera, splendid early spring and late autumn weather, resulting in multiple broods of many species. In every way a worthy Victory year.

## BRITISH TRYPETIDAE.

By M. NIBLETT.

Owing to various calls upon my time and to incidents arising from bombing during the past few years, I have been unable to devote much time to the biological study of Trypetids, but have managed to collect the following notes, which may not be without interest.

*Euribia cuspidata*, Mg.—In a previous paper (1) I recorded having discovered at Beachy Head, Sussex, the second known locality for this insect in Britain; its host-plant *Centaurea scabiosa*, L., was quite plentiful but, although a considerable number of the plants were examined, only eight galled heads were found: these yielded 7 ♂♂ of *cuspidata*, which emerged between 6th and 15th June of the following year, and 19 Chalcids came out between 15th June and 3rd July.

*Euribia stylata*, Fab.—In August 1942 among a few flower-heads of *Cnicus palustris*, L., collected at Wimbledon Common, one was found containing a small hard gall; in the following June, 1 ♂ and 1 ♀ *E. stylata* emerged. I know of no record, British or Continental, giving *C. palustris* as a host-plant of *stylata*.

*Myopites blotii*, Breb.—Flower-heads of *Pulicaria dysenterica*, L., with galls of this species in them I have found, or had sent me, in some numbers; all have occurred in coastal districts. I have searched in many inland localities where the plant was more or less plentiful; all these searches failed to reveal the gall until at the end of August 1945 I found a few galled heads at Epsom Common. Another visit in October resulted in a few more being found in another situation; on the same day several more were discovered at Ashted Common.

*Philophylla heraclei*, L.—At the end of May 1940 Mr H. Audcent sent me a number of leaves of *Smyrnium olusatrum*, L., from Clevedon, Somerset, heavily mined by the larvae of this insect; I was extremely pleased to receive these as this host-plant was an unrecorded one. 112 of the larvae pupated and on 28th June there emerged 21 ♂ and 10 ♀ *heraclei*, followed on 3rd July by 10 ♂♂ and 18 ♀♀. Two Chalcids came out in early August. At the beginning of July of the same year I visited one of our local Parks where, in a neglected corner, *Heracleum sphondylium*, L., grows profusely; many of the leaves were heavily mined but all the mines were empty. I had intended visiting this Hogweed patch in June 1941 but was unable to get there until 7th July. A good many mines were then empty, but there were still numerous larvae in others; from these I had emerge on 31st July, 11 ♂ and 6 ♀ *heraclei*, followed on 6th August by 2 ♂♂ and 4 ♀♀. Between 3rd and 23rd September there emerged 15 Braconids and 2 Chalcids; in May of the following year 1 Ichneumon and 2 Chalcids came out. All the *heraclei* bred were of the light form, except a few, which might perhaps be considered intermediate between that and the dark variety.

*Chaetostomella onotrophes*, Lw.—I have again bred this species from *Serratula tinctoria*, L. On 12.v.42 I had 4 ♂♂ and 5 ♀♀ emerge from flower-heads of that plant collected at Banstead Downs in the previous December. In 1932 in my garden I found a plant of *Centaurea montana*, L., with a few larvae of this species in the flower-heads; in 1940 and again in 1945 they were found there, so it looks as though the insect has established itself. *C. montana* has been recorded as a host-plant of



this insect on the Continent, but I know of no British record. The original insects undoubtedly came from plants of *C. nigra* that I had growing in the garden for several years.

*Chaetorellia jaceae*, R.D.—Although I have had thousands of the flower-heads of *Centaurea nigra*, L., the host-plant of the larvae of this species, and have bred hundreds of Trypetids from them I have only had 4 *jaceae*, 2 ♂♂ and 2 ♀♀ emerging on 5.vi.41; Dr G. C. Varley informed me some years ago that it was far more common than *C. onotrophes* around Cambridge. I have had *C. nigra* heads from 15 localities in Surrey, but have only bred *jaceae* from one.

*Paroxyna misella*, Lw.—Mr H. W. Andrews very kindly sent me at the end of June 1941, from Eltham, Kent, four fresh galls caused by this species on stems of *Artemisia vulgaris*, L.; from these I had emerge 5 ♂ and 10 ♀ *misella* on 10th July. The emergence time of this Trypetid was a considerable surprise to me, all other stem-feeding species as far as my knowledge of them goes, pass the winter in the stems as larvae; they pupate in the spring usually, a short time before the fly emerges.

*Oxyina parietina*, L.—Again my thanks are due to Mr Andrews who sent me some stems of *Artemisia vulgaris*, L., containing larvae of this species, from which I had a good series of the fly emerge in May, followed by a number of Chalcids in June. I have examined stems of Mugwort in a number of localities, but have failed to find the larvae myself.

The point to be noted is, that there was no sign of any swelling of the stems; Houard (2) records it as causing galls on stems of *A. campestris*, L. and *A. absinthium*, L. I feel that there is some doubt as to these galls having been caused by *parietina*. Rudow (*Zeitschr. f. d. ges. Naturw.*, 1875, 282, 4) described a stem-gall on *A. campestris*, which he ascribed doubtfully to this species, but he apparently did not breed the fly. This may have been the origin of the various statements that it was responsible for the formation of galls. Hendel (3) states that the larvae occur in the stem-pith of *A. vulgaris*, mostly without producing external deformation of the stem.

*Sphenella marginata*, Fall.—In 1945 larvae of this species were quite plentiful in flower-heads of *Senecio jacobaea*, L.; I also found *S. viscosus*, L., on Ashted Common at the end of August with numerous larvae in the heads. *S. viscosus* is an addition to the list of plants I have bred this species from.

*Ensina sonchi*, L.—I am now able to add *Sonchus asper*, Hill., to my list of host-plants for this species. During August 1945, larvae and pupae were very plentiful in flower-heads of *Picris hieracioides*, L., and *Sonchus arvensis*, L., nine puparia being found in one head of the latter. In early July I found some larvae feeding in the seeds of *Tragopogon pratensis*, L., in which they pupated, much in the same way as do the larvae of *Euribia quadrifasciata*, Mg., in the seeds of *Centaurea nigra*, L. In both the seed is too small totally to enclose the puparium, so a portion usually projects from the base of the seed and sometimes the puparium falls out and lies loose in the head. I have not been able to ascertain definitely whether the larvae always commence their lives in the seeds, but think it very probable: in the host-plants, where the

seeds are small, it is usual to find the puparia among the pappus-hairs, but it will be found that the base of the seeds have been eaten away.

*Tephritis conjuncta*, Lw.—In a previous paper (4) I have some records of *Tephritis leontodontis*, De G., as having been bred from flower-heads of *Chrysanthemum leucanthemum*, L.; this was an error, the species should have been given as *conjuncta*. I have since found these larvae on the same plant at Ranmore Common.

*Tephritis vespertina*, L.—On 24th June 1942, I found that the flower-heads of a number of plants of *Hypochoeris radicata*, L., growing in my garden had pupae of this species in them; I kept them under observation with the idea of ascertaining whether there would be any signs of a second brood. From a few heads I took off the plants I had emerge 15 ♂♂ and 9 ♀♀ during the first week of July; I removed all the remaining heads dropping them upon the ground adjacent to the plants. Many new flower-heads developed, some on new stems thrown up by the plants later; every flower-head was examined, but no trace of any larvae or pupae could be found in any of these later heads. In mid-June of the following year *vespertina* pupae were again plentiful in the flower-heads of the year. In 1945 I examined many flower-heads in the late summer, in localities where I had found larvae or pupae earlier, but all were empty of *vespertina*. I feel we may safely conclude that this species is definitely single-brooded; there is a possibility of hibernated females depositing a succession of eggs, or of some delaying their ovipositing, thus producing what might be mistaken for a second brood.

*Trypanea stellata*, Fuess.—This species is recorded as having many different host-plants the majority of which I had examined frequently for the larvae, but without success until 1945; on 24th August, a number of flower-heads of *Senecio jacobaea*, L., were collected at Riddlesdown; from these emerged between 31st August and 7th September, 3 ♂ and 1 ♀ *stellata*. I collected some 2000 flower-heads of *S. jacobaea* from eight other localities during July and August but bred no *stellata* from them.

*Noëtta pupillata*, Fab.—I have recorded (4) the larvae of this species on *Hieracium* sp. at Setley Plain, Hampshire, and I am now able to state that the plant in question was *H. sabaudum*, L. In all other records of mine of *pupillata*, *H. umbellatum* was the host-plant, on which I have found the galled flower-heads at Friday Street, Limpsfield Chart, Arbrook Common, Epsom Common, Banstead Downs, Walton Heath, Woldingham, Ashted Common, Boxhill, Wimbledon Common, Worms Heath, Oxshott Heath, and Croham Hurst; at Brockenhurst, Hants; at Shalfleet, Isle of Wight.

It should be noted that all localities given are in Surrey except where noted otherwise.

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## ORTHOPTERA IN THE MIDLANDS.

By R. W. PAYNE.

The following notes on the distribution of grasshoppers in Leicestershire and adjacent counties may be of interest. New county records are indicated by an asterisk.

*Tetrix vittatum*, Zett.—Northants\*: Wakerley, a single specimen taken in a disused limestone quarry, 2.9.45.

*Omocestus viridulus*, L.—Leicestershire\*: common throughout the county. Rutland\*: common in the district of Uppingham, i.e., the southern part of the county. Northants\*: common in the area north of Kettering; the only part of the county with which I am familiar.

*Myrmeleotettix maculatus*, Thunberg.—I have seen this species in Derbyshire (Dovedale) and Notts (Finningley), but have not so far met with it in Leics., although it is recorded for this county by Lucas (*British Orthoptera*, 1920).

*Chorthippus bicolor*, Charpentier.—Leicestershire\*: the most frequent species, common throughout the county. It undoubtedly prefers dryer, more exposed situations than either *O. viridulus* or *C. parallelus*, the two species which rival it in abundance in this county. Rutland\*: common in the Uppingham district.

*Chorthippus parallelus*, Zett.—Leicestershire\*: common throughout the county. Rutland\*: Lyddington.

## THE PARNASSIUS APOLLO, LINNAEUS, FROM THE ABRUZZI.

By ORAZIO QUERCI and SERGIO BEER.

Turati, in his description of *Parnassius apollo*, race *civis* (A), points out that the number of races of this species is always increasing, but differences among them are often so doubtful that we must now base our classification not on peculiar characters but on the labels of locality. In the study of the *apollo* we see the dangerous consequences of the actual tendency of taxonomy which, instead of clear and useful arrangement of individuals in natural groups, pursues the line of extreme subdivisions. Moreover, nearly all those new groups are called "races," and many of them are founded on a few specimens only. In this method there seems to be two errors: first, the application of the term race, which properly ought to have a genetic meaning and not a geographical one, and it would be better to call them either local forms, or colonies, owing to the difficulty of discriminating the general factors from the environmental ones; secondly, the insufficiency and vagueness of characters chosen. In fact, independently from any suggestion upon the real value of the term character, we find frequently that a local form, described at first as having certain characters, is later found as having others. It would be desirable that the description of a local form be based on a number of individuals showing in general some constant and remarkable difference or differences from those of other colonies.

These considerations are kept in mind in this paper as we are looking at 176 male and 176 females of *Parnassius apollo*, Linn., taken in four different places of the province of Aquila in the Abruzzi; each

specimen bearing a numbered pin-label; the numbers cited here refer to those specimens. To make clear what we say, we refer our descriptions to Seitz's figures (B), it being easy to get this well-known work. In order to discover the peculiar characters, common to most specimens of each locality, one of us mixed altogether some individuals from different places, hiding their labels, and another tried to recognize and assemble those of the same place. Clorinda Querci, Erilda and Lycaena Romei (who had taken these *apollo* in the field) aiding us, we each made these trials independent of each other. Sometimes we succeeded, at other times we were wrong, and then we discussed the causes of our mistakes. Thus we suppose that we can quote the most valuable characters, which are useful for identification.

I. MAJELLA.—The *apollo* from the Majella mass, which Oberthur (C) named *italicus*, were taken in the same area whence that author received some specimens. Our individuals were on the wing from 3rd to 11th July 1943, and as afterwards the weather became bad, only a few specimens were assembled both in the valley, 4000 to 4500 ft., which from Piano di Cinquemiglia rises to Pratello Mt., above Roccaraso, and along the slopes of Calvario Mt., 4500 to 5000 ft., in front of Roccaraso. They were flying high, rapidly and restlessly.

Wing expanse: males 70 to 73 mm., females 70 to 80 mm. The black pattern of the forewings is similar to that of Seitz's figures of *bartholomaeus*, and also the hyaline bands are as sparsely dusted with white scales as in those figures. Only a few males (4, 5, 9, 18) have the submarginal bands narrow as in *vinnigensis*. The white spots, between the two hyaline bands, are as well marked as in *bartholomaeus*, and sometimes (4, 5, 9, 16, 18) like they are in *albus*; while in two females (22, 34) they are small and isolated more than in any *apollo* figured by Seitz. The ocelli of the hindwings are generally rounded and with shining pupils as in *hesebolus*, or in the Scandinavian *apollo* figured in top of the Pl. 12. In three males (11 to 13) and one female (35) the upper ocelli are horizontally elongated, as in *pseudonomion*, but with white pupils. There are however four males (14 to 17) in which those ocelli are as small and without pupils as in the male figure of *provincialis*. The lower ocelli are more or less rounded and with bright pupils in all the *apollo* from Roccaraso in our set. In a single male (18) the colour of the ocelli is yellow, and also on the underside of this fresh and perfect specimen both the ocelli and spots are as pure yellow as in *nevadensis* from Andalusia. The other characters of the *apollo* from Majella are not worth recording as they vary in the same manner as in the other places from the Abruzzi whence we have specimens.

II. SIRENTE.—Both in July and August 1941 the *apollo* were plentiful in the meadows covered with juniper bushes among the beech-tree woods, 4500 to 5000 ft., of Monterotondo Mt., in front of Roccadimezzo, in the Sirente mass, that is quite in the same place where the specimens, which Turati named *civis* (A), were taken some years ago by Marquis Lepri.

Most males from Sirente are smaller than those from Majella as their expanse of wings is 62 to 72 mm. Shape of wings, pattern and tinge of the forewings vary in the same way as in *italicus*, but in our set of 70 males most of them can be distinguished from most of Majella (1 to 13). Looking at the upper ocelli of the hindwings which are small,



elongated, generally blind and inclining towards the apex of the forewings when the specimens are set. The lower ocelli are small, ovoidal, with small pupils and sometimes blind, while in the Majella males the same ocelli are rounded and with prominent pupils. None of the *apollo* figured by Seitz have a form of ocelli similar to that of most *civis*. Sometimes they are so small that the pattern of the hindwings of a few specimens (62 to 69) looks like that of some *pumilus* from Calabria figured by Turati (E). However, we have some males (83 to 89) in which the ocelli are rounded and with pupils. They resemble the *italicus* (14 to 17) of the less frequent forms.

Most females from Sirente are smaller than those from Majella. Their expanse of wings varies from 67 to 80 mm. In our set of 71 females there are five (164 to 168) with rounded ocelli and well-marked pupils looking like those (19 to 30) of the most frequent forms from Majella. The others can be distinguished by the feature of the upper ocelli which are either ovoidal, or irregularly outlined, with small pupils and often blind. In a few females (159 to 163) the ocelli are narrow and elongated as in some *pumilus* figured by Turati (E).

III. EASTERN GRAN SASSO.—From mid-July, and during the whole August 1939, many *apollo* emerged along the slopes of Capodisere Mt., 4200 to 5000 ft., above Casteldelmonte, in the eastern side of the Gran Sasso mass. Verity (F) named those specimens *romeii*.

The males are generally wider than those from Majella and Sirente and they look still larger owing to the considerable extent of the white scaling on the forewings, which in many cases covers most part of the hyaline submarginal band and extends, along the nervures, up to the margin, as in the *apollo* from Scandinavia figured by Seitz. The upper ocelli are about the same sizes of those of most *italicus*, but frequently they are either with a small pupil or blind. Also the lower ocelli are sometimes blind while, as we have already recorded, this never occurs among our *italicus* from Majella. Only one male (4) from this latter locality looks like one (205) from Capodisere. Comparing 70 males from Sirente with 36 from Capodisere, we see fifteen *civis* (92 to 106) similar to three *romeii* (210 to 212). These *apollo* can not be recognized without looking at their labels.

Most females from Eastern Gran Sasso can be distinguished from those of Majella and Sirente by looking at the upper ocelli which are large, rounded, either without pupils, or with small ones. In our set there are only two females (237, 238) having well-marked white pupils, as in most *italicus*, and five (240 to 244) in which the upper ocelli are as elongated as in most *civis*. The lower ocelli have generally small pupils and they are always rounded.

IV. CENTRAL GRAN SASSO.—In August 1942 a large number of *apollo* were on the wing along the barren slopes of Portella Mt., 6000 to 6600 ft., in front of Monte Corno, in the Gran Sasso mass. Those butterflies, perhaps owing to the strong wind, which never ceased in that season, remained long on the thistle flowers and we were often able to take them with our fingers even if the sun was shining.

Most males (245 to 273) and females (294 to 324) vary in the same manner as those of the prevailing forms of Sirente (r. *civis*); other males (274 to 282) resemble *pumilus* from Calabria also for their small size; a few males (283 to 285) and females look like some *italicus* from



Majella; and some males (285 to 293) and females (334 to 347) might be referred to *romeii* from Capodisierre. There are also five females (348 to 353) looking very dark, much darker than in Seitz's figure of *limicola*, which were taken around a marshy place, 6000 ft., along the path which from Assergi rises up to the hotel of Campo Imperatore, which are similar to some females of *brittingeri* from Styria we have seen in a Roman collection.

SUMMARY.—The characters that in most cases have allowed us to recognize where the *apollo* were taken without looking at their labels can be summarized as follows:

MAJELLA (r. *italicus*, Ob.), middle size, moderate extent of the white scaling on the forewings as in Seitz's figures of *bartholomaeus* and *albus*, rounded ocelli with more or less showy pupils as in *hesebolus*, *melliculus* and Scandinavian *apollo*.

SIRENTE (r. *civis*, Trti.), smaller than *italicus*, pattern of the forewings as in that colony, small, elongated, inclined ocelli, about as in *albus* male, but narrower.

EASTERN GRAN SASSO (r. *romeii*, Vrtty.), large and looking still larger owing to the wide extent of the white scaling on the forewings, like those in Seitz's figure of *apollo* from Scandinavia, big and rounded ocelli, with faint pupils, like those in *limicola*, *provincialis* female and *sibiricus*.

CONCLUSION.—According to our remarks, *italicus*, *civis* and *romeii* seem to be three well characterized and localized colonies [=races, Hy. J. T.] of *apollo*. Regarding *italicus* we find, in our set, characters more or less different from those quoted by Oberthur (C), Turati (D), and Bollow (G). We note also that at the highest altitudes in which the *apollo* live on the Apennines (6000 to 6600 ft.) those three forms are not only mixed together but also with small *pumilus*-like individuals and with blackish ones, like *brittingeri*, which normally inhabit distant districts. It happens that the variability of that alpine population is greater than that of the surrounding localities. Perhaps this fact may be related with Vavilov's views (H) on the polymorphism of any species which seems to be wider in its "genetic center." If following research confirms the above suggestion, Turati's hypothesis (E) about the Italian origin of *apollo* would have an unexpected corroboration.

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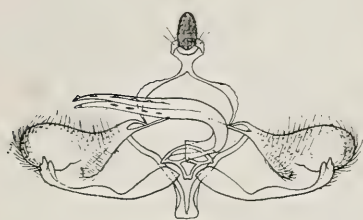
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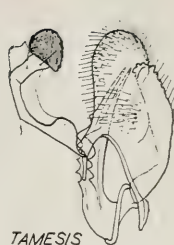




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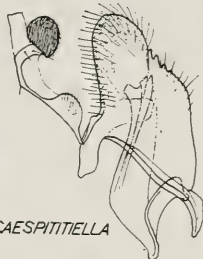
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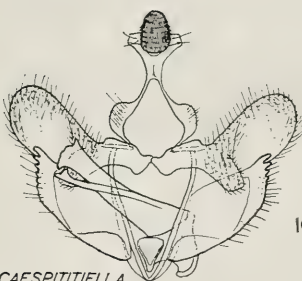
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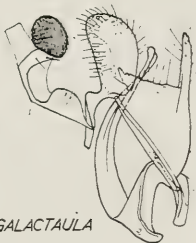
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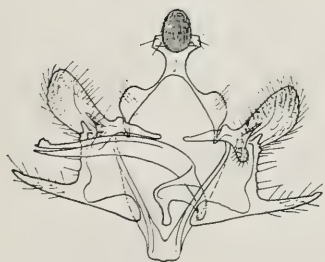
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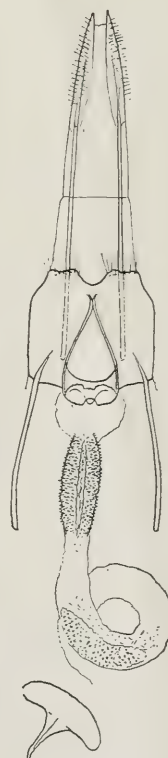
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13. GLAUCICOLELLA



14. TAMESIS



15. CAESPITIELLA

THE GENITALIA OF THE JUNCUS-FEEDING SPECIES OF  
EUPISTA (LEP.).



## THE GENITALIA OF THE JUNCUS-FEEDING SPECIES OF EUPISTA (LEP.).

(With Plate I.)

By BRYAN P. BEIRNE, Ph.D., M.R.I.A., F.R.E.S.

The *Juncus*-feeding moths of the genus *Eupista* (*Coleophora*) resemble each other very closely and their reliable identification on external characters often is a matter of considerable difficulty, even with good specimens. The simplest and most reliable way of identifying them is by examination of the genitalia. Unfortunately some of the figures given in Pierce's "Genitalia of the Tineina" (1935) are very inaccurate and therefore misleading. Incidentally, it may be mentioned that the same applies to Pierce's figures of other species of the genus.

Two of the seven *Juncus*-feeding species are inhabitants of salt-marshes and have not been found in Ireland, but the genitalia of the remaining five species are shown in pl. I. The figures of each species represent the male genitalia ventral view with the valvae outspread and side view with the valvae in the normal closed position, and the female ventral view. The material examined consisted of 50 preparations of the genitalia of *glaucicolella*, 30 of *caespititiella*, 29 of *agrammella*, 20 of *galactaula*, and 10 of *tamesis*. The specimens were all from my own collection and were captured in Ireland.

If the genitalia of a large number of specimens from different parts of the British Isles are examined many interesting discoveries should be made. For instance, certain species may be found to be far more common and widely distributed than is supposed; during 1944 I captured 93 specimens at random and on examination of the genitalia found that they consisted of 30 *glaucicolella*, 24 *agrammella*, 16 *galactaula*, 5 *tamesis*, and only 18 *caespititiella*; *tamesis*, formerly recorded only from Oxford, has proved to be widely distributed in Ireland, having been found in counties Dublin, Leix and Kerry.

*E. agrammella*, Wood (figs. 1, 6, 11): Pierce's figure of the male (*loc. cit.*, pl. XXXIV) apparently represents *caespititiella*, and his description of the supposed differences between the two species can be explained by differences in mounting. His figure of the female has several misleading inaccuracies. *E. tamesis*, Waters (figs. 2, 7, 14): Some differences from Pierce's figures are apparent, notably in the general shapes of the genitalia in both sexes and in the shapes and relative sizes of the various parts. The same applies to *E. glaucicolella*, Wood (figs. 4, 9, 14), to *E. caespititiella*, Zell. (figs. 3, 8, 15), and to *E. galactaula*, Meyr. (*alticolella*, Meyr. *nec.* Zell.) (figs. 5, 10, 13). It is difficult to explain why Pierce's figure of the male *galactaula* should be so inaccurate; I have seen his preparation which, although somewhat distorted, is very like what I have figured.

The genitalia of these five species indicate a close relationship between *agrammella* and *tamesis* and between *caespititiella* and *glaucicolella*. *Galactaula* is rather distinct, but is nearest to *glaucicolella*.

Some notes on a rapid method of preparing genitalia for the identification of specimens may be useful. Firstly, remove the abdomen from the specimen and boil it up in a weak (5 or 10%) solution of caustic potash until it becomes soft and all waste matter has disappeared, leav-

ing the sclerotised and membranous parts. With *Eupista* this normally takes three to five minutes, but takes longer for larger specimens. The caustic solution may be heated in a watch-glass over a water-bath or in a test-tube in a beaker of water. Then transfer the abdomen to acetic acid. While in the acid the scales may be scraped gently off the abdomen with a needle and the genitalia drawn out of the terminal abdominal segments into which they often are retracted. It is most convenient to have the acid in a watch-glass or, better, in the cavity of a hollow-ground slide. After a few minutes in the acid, transfer the genitalia to a drop of Faure's Medium on a slide, arrange in position, and apply a coverglass. The advantages of this method are that a large number of preparations may be made in a relatively short time; while one specimen is in the caustic another is in the acid and a third is being mounted on a slide, that it is not necessary to dehydrate when using Faure's, the specimen being mounted directly from the acid, and that the Faure's keeps the genitalia soft so that they may be removed and dissected or remounted months or even years afterwards.

EXPLANATION OF PLATE.—Genitalia of the *Juncus*-feeding species of *Eupista*: figs. 1-5 males, ventral views with valvae outspread; figs. 6-10 males, lateral views with valvae in normal closed position; figs. 11-15 females, ventral views.

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### THE GENETICS OF *CROCALLIS ELINGUARIA*, L., AB. *FASCIATA*, GILLMER, AB. *BREVIPENNIS*, AB. *NOV.*, AND AB. *UNICOLOR*, PROUT.

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

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In addition to his extensive breeding experiments with *Angerona prunaria*, L., the late Dr H. D. Smart bred *Crocallis elinguaris* for three years, using as stock the offspring of three females obtained in Skye, which he called broods A, B, and C.

Brood A consists of ab. *fasciata*, which are as fine as any I have seen. The ground colour is free from speckling and more orange than the straw colour of typical specimens (light orange yellow, Ridgway) with a rich brown median band (Sayal brown, Ridgway) and very dark ante-median and postmedian lines in the males. The median area in the females is not as brown, but the lines are as distinct.

Brood B. The ground colour in all the males has brown scales mixed with the paler ones, producing a colour near warm buff, Ridgway, and the band is a little darker than the ground with a paler line on its inner and outer aspect. Seven are darker (tawny olive, Ridgway), and in one of them the band is very dark. The females are paler, one being intermediate between pale orange yellow and light orange yellow, Ridgway, others paler buff than the males.

Brood C. Both sexes vary from pale orange yellow to light orange yellow with the median area in one male and two females almost the same colour as the ground colour, others with it darker, but in none is it as dark as in ab. *fasciata* nor are the ante- and postmedian lines as dark.



Brood D closely resembles Brood C in all respects.

Brood E. One male is like the intermediates of C, and four are as dark a brown as the darkest males of B (tawny olive, Ridgway). The females have rather more speckling than those of B and are, therefore, browner and less orange. In the brownest, a male and two females, the dark lines are very distinct.

Brood F are all ab. *fasciata* like Brood A.

Brood G. There are five males with brown speckling on the ground colour like those of E and three males are dark brown (tawny olive); two females are light orange yellow and four are warm buff. Two males are light orange yellow with the transverse lines as dark as in ab. *fasciata*, and one male is ab. *fasciata* like those of Brood A.

Brood H. One female is warm buff and one has the median area darker than the ground colour, like the darkest in C and D. One male has the ground colour darker brown than any in those broods.

Brood J. All are ab. *fasciata* and are under-sized, but the females have the median area as dark as the darkest males in A or F. The ground colour is warm buff.

Brood K are all ab. *fasciata*, but in one male the band is not as dark as in males of Brood A. The females have the dark ante- and post-median lines of ab. *fasciata*, but the median area is not as dark as in A.

Unfortunately Dr Smart did not keep the parents of his broods, nor does he state their full numbers. It is evident that the specimens he kept are representative samples of each brood, but it is not safe to assume that the various forms are represented in the correct ratios.

I give the numbers and sexes of the samples of each brood with Dr Smart's brood numbers, but the conclusions drawn from his results are my own. Assumptions are made, which would have been unnecessary, if he had kept complete data.

Brood A (parentage unknown), 1938. 16 ab. *fasciata*, 8 ♂, 8 ♀.

Brood F (A × A), F<sub>1</sub> gen., 1939. 16 ab. *fasciata*, 8 ♂, 8 ♀.

Brood J (F × F), F<sub>2</sub> gen., 1940. 12 ab. *fasciata*, 6 ♂, 6 ♀.

Brood B (parentage unknown), 1938. 16 variable, no ab. *fasciata*, 8 ♂, 8 ♀.

Brood C (parentage unknown), 1938. 16 variable, no ab. *fasciata*, 8 ♂, 8 ♀.

Brood D (A × C), F<sub>1</sub> gen., 1939. 16, 9 normal, 6 ♂, 3 ♀, no ab. *fasciata*, 7 examples of a new form, which I am naming ab. *brevipennis*, 4 ♂, 3 ♀.

Brood H (D × D), F<sub>2</sub> gen., 1940. 10, normal 6 ♂, 2 ♀, 2 ab. *brevipennis*, 1 ♂, 1 ♀.

Brood G (A × B), F<sub>1</sub> gen., 1939. 14, number of ab. *fasciata* doubtful, 8 ♂, 6 ♀.

Brood K (G × G), F<sub>2</sub> gen., 1940. 14, all ab. *fasciata*, 8 ♂, 6 ♀.

Broods A, F, and J show that Dr Smart probably had ab. *fasciata* in a homozygous state, and Brood D, a cross between a normal moth and a *fasciata* yielding all normal moths, proves that *fasciata* is recessive. Brood G, another cross between a normal moth and a *fasciata*, gave one very fine *fasciata*, two poor ones, and five dark brown moths, two of which may be *fasciata*, for the band is as dark as in *fasciata* of Brood A. Thus the ratio of normal to *fasciata* is uncertain, but may

have been 1 : 1, the result expected by crossing a moth homozygous for *fasciata* with one heterozygous for it. Presumably both parents of Brood K were *fasciata*, for all the progeny are exceptionally fine examples of this aberration.

Brood D produced a form not represented in the samples of Broods A and C, and since it is a striking form, one may assume that none were present in either of these broods. It is probably recessive, but the ratio in the sample is 9 normal to 7 *brevipennis*, instead of 3 : 1. I suspect that all the *brevipennis* were kept and many normal ones rejected. The parents of Brood H were probably normal in appearance, but heterozygous for the *brevipennis* character, but in the sample the ratio of normal to *brevipennis* is 5 : 1 instead of 3 : 1. This may be a complete brood, and, if so, the ratio is not far from that expected, allowing for the small size of the brood. If the brood is incomplete it is surprising that there are not more *brevipennis*. I think there can be little doubt that *brevipennis* is recessive to normal shape and pattern, and that ab. *fasciata* is recessive to the typical form.

Ab. ***brevipennis***, ab. nov. The costa is shortened, accentuating the concavity of the termen (the length of the forewing from base to apex in two males and two females being 15 mm., 15 mm., 15 mm., and 16 mm. respectively, and the distance from apex to anal angle 11.5 mm., 12 mm., 12.5 mm., and 13 mm., compared with 17 mm., 17.5 mm. from base to apex and 11 mm. and 12.5 mm. from apex to anal angle in a normal male and female of the same brood). The discoidal spot is large and very close to the postmedian line, which curves inwards to an unusual extent as it approaches the inner margin (the distance between the antemedian and postmedian lines is 8 mm. at the costa and 1.5 mm. at the inner margin, compared with 9 mm. and 4 mm. respectively in average specimens of the same brood). In this respect it resembles ab. *obviaria*, Ljungdahl. (*signatipennis*, Newstead and Smith), though the lines do not meet as in this aberration. The moths in spite of their short wings are not undersized, their bodies being as large as those of the normal members of the brood. All have nervure 8 missing in both forewings.

Type, 1 ♀, Skye, 1939. Bred by H. D. Smart.

Paratypes, 4 ♂, 2 ♀, Skye, 1939. 1 ♂, 1 ♀, Skye, 1940.

In 1942 Mr R. C. R. Crewdson sent me some pupae from the Black Wood, Rannoch, and from them I bred various forms including two ab. *unicolor*, Prout, both on the same day. I obtained a pairing and in 1943 bred 41, all *unicolor*, 21 ♂, 18 ♀, and 2 of which the sex was not noted. I obtained a pairing, but the eggs hatched a month earlier than those of the previous year, and few larvae survived. The 5 bred, 2 ♂ and 3 ♀, were all *unicolor*. Prout gives a very brief description of ab. *unicolor*, but as it was his custom to take figures in Barrett's work as types, there is little doubt that Plate 293, fig. 1e, is the type of ab. *unicolor*. Two of my males match it exactly, but the majority are slightly more buff coloured. In both sexes the median area is the same colour as the rest of the wing and there are no dark ante- and postmedian lines. In the males two pale transverse lines are just visible, but in some females even these are imperceptible. It is probable that ab. *unicolor* is recessive to the ordinary form with ante- and postmedian lines darker than the ground colour.



**SPILOGRAPHA VIRGATA, SP. N. (DIPTERA, TRYPETIDAE).**

By J. E. COLLIN, F.R.E.S.

Four species of *Spilographa* have been recorded as British; the common and widely distributed *S. Zoë*, Mg., remarkable for a sexual difference in wing markings; the closely allied and recently described *S. Wiedemanni*, Hend., found sparingly on *Eupatorium cannabinum*; *S. artemisiae*, F., and *S. hamifera*, Lw. (now known as *S. immaculata*, Mcq.); the last two mainly found in the northern part of this country. The discovery of a fifth species is due to the exertions of my friend, Mr Albert E. Wright, of Grange-over-Sands, Lancashire, whose work in connection with the insect fauna of that district is so well known; this very distinct species proves to be undescribed, and at Mr Wright's request the characteristic features of this interesting addition to the British List are now published.

*Spilographa virgata*, sp. n. ♀.

Superficially resembling *S. immaculata*, Mcq. (*hamifera*, Lw.) but easily distinguished from that and all other species by the shining blackish patch on front of thorax behind head, by its wing markings, and by the absence of small bristles on cubital vein except about its base.

♀. *Ocellar bristles short and fine*, four pairs of lower fronto-orbital bristles, the two anterior pairs longer and stronger, two pairs of upper orbital bristles, the posterior pair shorter. Palpi as broad as third antennal joint.

Thorax yellow, *with a shining black or brownish-black patch in front* composed of two short broad stripes fused together anteriorly, occupying the full space between the outer pair of scapular bristles.

Abdomen yellow, *with the large basal section of ovipositor shining black* and bearing black hairs similar to those on rest of abdomen. Legs yellow.

Wings with the usual apical dark patch, and three more or less complete transverse bands or markings. One beginning half way between apical patch and stigma *consisting of a pear-shaped* (broader below) *spot on costa, not, or indistinctly connected to a slightly more distal band which, widening as it passes over outer crossvein, and extends to wing margin*; the second band begins with stigma (dark for its whole length), the darkening continued as a slightly narrower, somewhat oblique band over middle crossvein *to middle of discal cell only*; a very faint cloud below postical vein opposite end of this second band may be indistinctly connected on wing margin with the first (subapical) band; finally a short band across middle area of base of wing from radio-cubital node to crossvein closing anal cell, both inclusive. Humeral crossvein also darkened. *Cubital vein with 3-4 small bristles on upper side at base* (near radio-cubital node) *only*. The wing markings are more distinct and bands more complete than in *S. artemisiae*, F., though that species appears to vary in these respects according to the figure given by Loew in 1862, in our British *artemisiae* the bands being more broken up into spots. Even compared with Loew's figure, the wing markings of *virgata* differ as follows:—The band arising in stigma is more abbreviated below, and not connected backwards to the short band nearer base

of wing, and this short band is more confined to vicinity of crossveins, and does not spread backwards to base of wing.

Length about 6 mm.

Mr A. E. Wright found this species on 23rd and 24th July 1944 on the leaves of *Solidago virgaurea* in a wood near his home. He caught three females (two of which he has generously given to me), and saw three other specimens which dropped down into the herbage beneath the plant and could not be found. The larvae of *Spilographa* are leaf-miners, therefore one might naturally suspect that the three females caught on *Solidago* were there for the purpose of oviposition, but unfortunately this has not, so far, been proved. A search by Mr Wright in 1945 failed to supply either larvae or additional imagos. The birch and hazel undergrowth in the wood had grown up and overshadowed the herbage and *Solidago* plants, and the flies appeared to have deserted the original locality, nor could any specimens be found by diligent searching and sweeping in the vicinity, moreover the search was repeatedly hampered by unfavourable meteorological conditions. There is no doubt that Mr Wright's pertinacity in such matters will sooner or later be rewarded, and the question in connection with the food-plant of this species answered.

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## THE GEOGRAPHICAL DISTRIBUTION OF CERTAIN HEBRIDEAN INSECTS AND DEDUCTIONS TO BE MADE FROM IT.

By J. W. HESLOP-HARRISON, D.Sc., F.R.S.

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As is well known, for a long period of years, expeditions, organised by the Department of Botany, King's College (University of Durham), have been studying the flora and fauna of the Inner and Outer Hebrides. During the course of these investigations, we have encountered forms, belonging to many groups of plants and animals, displaying marked peculiarities in distribution, which naturally invited speculation as to their causes. Obviously, these problems and their solution depended directly upon changes in the Quaternary geography of the islands. Thus we were compelled to study not only the present biogeography of the Hebrides, but also that of their past.\* This does not seem an appropriate time to discuss our work in the latter direction, nor to deal with all animal and plant groups; it is proposed to confine attention to the distributions of a very limited number of Hebridean insects, and to set out the more important deductions made from them in the light of recognized biogeographical principles.

But, before doing so, it will be well, perhaps, to supply Braun-Blanquet's admirable and concise exposition of biogeographical methods as provided in the *Annales de la Société Linnéenne de Lyon* (1922, Vol. 68, page 140). There he writes: "L'une, géographique, part de la distribution actuelle des organismes et de leurs groupements naturels. Elle étudie leurs conditions de vie, leur capacité d'accommodation, leur faculté d'expansion. Retracer les voies de migration, esquisser aussi exactement que possible les liens géographiques, discerner les centres de dispersion, voilà le but auquel tendent les efforts."

Amongst the insects we have encountered lending themselves to such



work and methods, none stand out more significantly than the Lepidoptera, *Nyssia zonaria*, *Euphydryas aurinia*, *Zygaena purpuralis* and *Z. filipendulae*, and the Hymenoptera, *Bombus smithianus*, *B. jonellus* var. *hebridensis* and *B. muscorum* var. *pallidus*. Of these *Nyssia zonaria*, an insect possessing an apterous female, deserves special attention for it occurs throughout the "Long Island" from Lewis in the north to the Barra Isles in the south, in Coll, Gunna and Tiree, and in Muck, Eigg, Rhum and Canna. Further, *Bombus smithianus* and a number of plants have a similar range.

Clearly, these groups of islands harmonize in their zoogeographical affinities as determined by these insects as indicators. Moreover, these insects are absent from the Scottish mainland, and from the Isles of Skye, Rona, Raasay, Scalpay, Mull, Colonsay, Islay and Jura, in all of which *B. smithianus* is replaced by its ally *B. muscorum* var. *pallidus* of mainland proclivities. From these facts, several conclusions can be drawn: (1) That the Outer Isles, the Coll-Tiree group and the Rhum-Eigg-Canna series have undergone a long-continued separation from the mainland; (2) that they have been linked up amongst themselves during that severance; and (3) that when the Isles of Skye, Mull, Raasay, Rona, Scalpay, Colonsay, Islay and Jura received their *Bombus* population they were united to, or within easy access of, the mainland and, notwithstanding the proximity of some of the isles supporting *B. smithianus*, not approachable from them.

Again, *Bombus jonellus* var. *hebridensis* is restricted to, and endemic in, the Outer Isles. This points to a considerable lapse of time during which the Outer Isles and Inner Isles remained separate, whilst the insect was evolved and dispersed.

Furthermore, the concentration of the American group of plants in the Isle of Coll suggests a connection between Coll, Tiree and Gunna on the one hand, and Ireland on the other, long after all three had parted from the Outer Hebrides; this view is supported by the occurrence of the Irish Burnet (*Zygaena purpuralis*) in Gunna, and of the Irish form of the Greasy Fritillary (*Euphydryas aurinia* var. *praeclara*) in Tiree and Gunna. In addition, for similar and other reasons, Rhum and Eigg come into the same picture.

Taking cognizance of many observations of these types and their implications, we have made what we considered legitimate deductions about the distribution of Hebridean organisms and their history and geography. For instance, when an insect, obviously of anomalous distribution, has been detected on one or more islands appertaining to groups related zoogeographically, we have regarded the fact as indicating the possibility of the same insect's (or its allies') presence on other islands of the series. It will suffice, of the many available, to quote two such published forecasts. In the *Entomologist* (LXXV, p. 36), on the basis of the capture of *Notodonta ziczac* in Harris and South Uist, the possibility of its occurrence on Benbecula, North Uist, is put forward. In the same way (*Ent. Record*, December 1940, p. 137), after references to the Rhum, Eigg and Gunna colonies of *Zygaena purpuralis*, it is urged that the Irish Burnet might reasonably be expected to turn up on "Muck, Canna and the southern members of the Outer Island chain."

To the latter pronouncement, for reasons best known to himself,

Mr J. L. Campbell seems to have strong objections, and, after a previous tilt in the *Entomologist* for November 1944 (p. 175) he returns to the subject in the current (December) number (p. 188) of the same magazine. There we are informed that predictions, made on principles regarded as sound by all zoogeographers, are "without scientific value and lacking in courtesy to fellow entomologists." This cannot be allowed to pass.

In the first place, Mr Campbell asserts that I stated that he only recorded *Zygaena filipendulae* from one locality (Ben Erival) in Barra; my statement is absolutely true. He manages to make up his alleged five localities by including the separate Isles of Hellisay, Flodday, Pabbay and Orosay, one of which, Pabbay, is  $5\frac{1}{2}$  miles from Barra. Again, he claims that he recorded the Six-spot Burnet as "widespread but local and not very common" in Barra. This, likewise, fails to agree with the facts; of his five habitats, only one is on Barra, the remaining four being in other islands, and, secondly, the insect is very common on the Isle of Barra itself, and on Fuday, Fiaray, Muldoanich, Vatersay, Uinessan, Sandray, Pabbay and on the second Flodday lying west of Sandray. Then he recounts that the Isle of Barra was well searched for Lepidoptera in 1935, 1936 and 1937 by himself, the University of Edinburgh Biological Society and Mr R. B. Freeman. In a letter to me (3/3/41), he writes that he made a very careful examination of Barra in 1936 and 1937, and those details he repeats in his *Scottish Naturalist* paper (November-December 1938, p. 137). Here, it will be observed, there is no reference to his searches for Lepidoptera in 1935 nor to the "several years" of his 1944 note. Further, he fails to mention that the Edinburgh Biological Society record no *Zygaena* from Barra, and only *Z. loniceræ* (erroneously) from Hellisay and Orosay. In connection with the latter records, Mr Campbell adds further mystification; in some extraordinary way only one specimen seems to have been involved!

This then is the sorry picture which Mr Campbell adorns with the optimistic description of "exhaustive and thorough work."

A dispassionate examination of the real facts will show that, in view of Campbell's sketchy examination of Barra, which led to almost negligible results, there is no necessity for me to withdraw or modify in the slightest my prediction concerning *Z. purpuralis* and the southern members of the Outer Island chain. As far as Canna is concerned, Mr Campbell has attended to that; his unwarranted transplantation of Rhum examples of *Z. purpuralis* to Canna has effectually vitiated any future zoogeographical work with the insect on the latter island. Concerning this peculiar episode, and his "experiments" with the food-plants of the insect, our friend maintains a very discreet silence.

One more reference to Mr Campbell's note will suffice. He makes a pitiful attempt to father on me a view that Wreck Bay and the Sgorr Reidh on Rhum are the same in order to consolidate the position that he has discovered a new station for the Irish Burnet on Rhum. On no occasion have I stated that they were the same. My original note (*Ent. Record*, December 1940, p. 137) gives the *purpuralis* locality as "North-West of Harris along the cliffs." The total distance involved in this is less than three miles, of which the Sgorr Reidh guards the landward side of Wreck Bay.



Despite Mr Campbell, the known geographical distributions of *Zygaena purpuralis* and *Z. filipendulae* remains of enormous importance to the student of Hebridean zoogeography, the first-named as indicating ancient land connections between Rhum, Eigg and the Coll group and with Ireland, and the latter in affording evidence that there has existed a period, possibly post-glacial, when migrating organisms had free access from the mainland to the whole of a Hebridean area, now represented by both the Inner and the Outer Isles.

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### ON DRAWING CONCLUSIONS.

BY AN OLD MOTH-HUNTER.

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"Life," wrote Samuel Butler, "is the art of drawing sufficient conclusions from insufficient premises." Bionomics, on the other hand, at least so far as insects are concerned, ought to be the art of drawing *possible* conclusions from abundant premises. Where moths are concerned "you never can tell," and the wise Lepidopterist prefers "possible" to "probable" even when dealing with cast-iron evidence.

On 27th July, two years ago, while searching birch on a hillside near my war-time abode, I found, on the underside of a leaf, a black hemispherical eggshell which reminded me so strongly of *Cerura hermelina*, Göze (*bifida*, Hub.) that I sent it to South Kensington for identification. The great expert who examined it considered that my guess at *C. bicuspis* was not unduly optimistic, *pabulo intuyente*. Yet although I devoted the two succeeding winters—or at least such parts of them as were free, for an hour or two, from rain, or on which I was not afflicted with laziness—to a scrutiny of every birch where this eggshell occurred, nary a cocoon could I find. Not even an empty one. I read and re-read the instructions of Dr Chapman (who found *bicuspis* in quantity in Herefordshire) and the Reverend Miles Moss (who was equally successful in Norfolk), and I carried an aged mackintosh whereon I could sit down beside likely trees and examine the trunks with the eyes of a woodpecker. To no avail.

A fortnight ago—it was in the first week of April—I chanced to examine trunks of alders in a meadow-bottom below the hill, a quarter of a mile from the site of my eggshell, and on one of them I found an aged cocoon that was plainly Cerurid. The only other trees within a radius of forty yards were oaks, a hawthorn, and, some ten or twelve yards away, a sallow. But a bog separated the sallow from the alders, a bog which, in September, becomes a very wet bog indeed; and to jump from tuft to tuft across this water-logged swamp would, I was convinced, try the constitution of any "Kitten" severely. Without doubt this old cocoon and my eggshell had a common origin—*Cerura bicuspis*, Bork.

Still, I was not *quite* satisfied. The cocoon did not answer to the descriptions of a *bicuspis* cocoon given in the textbooks, where it is said to resemble a Brazil nut. It wasn't in the least like a Brazil nut. It wasn't like any kind of nut at all. It resembled nothing so much as a cocoon of *C. furcula*, L. So I sent it, as I had done with my eggshell, to Mr Tams, and he too was doubtful. . . . But, said I to myself,

the eggshell at least betokened *bicuspis*, so *bicuspis* is here, and who ever heard of *furcula* feeding on alder? It must be *bicuspis*. I went back to the alders in the meadow and examined the terrain anew, and this is what I found.

Eleven feet (I paced it) from the sallow was a narrow footpath running from north to south which swung eastwards past the alder on which I had found the cocoon. So that if a larva, bred on the sallow, had traversed eleven feet of bog on the drier side in a westerly direction till he came to the path, then had turned at right angles (perhaps because he was footsore and found the going easier) and proceeded along the footpath for a little more than ten yards, he would have come within a couple of feet of the cocoon-bearing tree. And that, I believe, is what happened. Colour was lent to this supposition by an exactly similar cocoon of apparently the same age on an alder still nearer to the sallow bush.

The Pusmoth and Kittens often travel considerable distances in their search for suitable pupation sites (though "search" is not the right word, for a larva can see only an inch in front of his nose, and larval pre-pupational travel is governed—so says Allan—partly by time and partly by the histolysis of his tissues). I have found empty cocoons of *D. vinula* twenty yards from the nearest foodplant and this is by no means the record, *teste* the entomological magazines. So perhaps *bicuspis* may yet come my way—though I have no hope of beating the Reverend F. B. Newnham's record: he found *three* larvae in one afternoon! But, then, he was a Man of God; I am but a hoary old sinner.

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### INSECTIVOROUS SPIDERS.

By MALCOLM BURR, D.Sc., F.R.E.S.

---

A friend of mine in Istanbul, who is no entomologist but a keen gardener, told me that he once saw a butterfly alight upon a flower, and instantly become motionless. When he examined it, he found that a pale green spider was lurking in the flower, that had bitten the butterfly, and killed it instantaneously.

These living traps are common on the countryside round the Bosphorus, generally white or pale green in colour. They lurk motionless inside various kinds of flowers, and kill and devour any insect that falls into the trap.

One fine day at the end of June 1943, I noticed a *V. cardui* lying at an unnatural angle on a *Cistus*. When I picked it up, I felt resistance, and found that it was grasped by a green spider that held it tight. I found some more of the spiders, but when I offered them some butterflies, they were suspicious and did not bite, and dropped off the flower. Once I persuaded one to accept a Skipper.

On another occasion, on 17.7.43, I found a big white spider feeding on a *Tabanus* on a small marguerite in my garden.

At Gök Su I saw one dining off a bee four times its own size; on 26.6.44, and on 2.7.44 in the same place a small green spider on a *Scabious* was eating a bee, and a red and black spider nearby was also eating a bee. I offered it a Marbled White, but it declined it.



[Browning says these spiders belong to the family *Thomasidae*. The colour of a single species will vary according to its background, i.e., the colour of the flower. I have noticed this with our British species. Snow-white on ox-eyed daisies; yellow on yellow flowers, etc.—H. J. D.]

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### COLLECTING NOTES.

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UNUSUAL PAIRINGS.—On 5th August 1945, while I was collecting *Eremobia ochroleuca*, Schf., from Knapweed flowerheads in a grassfield in Hertfordshire, I found, on three occasions, all within a distance of 100 yards, a male *Adopoea sylvestris*, Poda, in *côp.*, with a female *E. ochroleuca*. I boxed all three pairs. Two pairs parted in the boxes but I managed to take home the third pair conjoined in the hope of setting them paired. Unfortunately they parted when I killed them prior to setting them. I shall be pleased to hear of any other pairings observed of butterflies and moths.—CLIFFORD CRAUFURD, "Denny," Galloway Road, Bishop's Stortford.

A LATE RECORD OF *PIERIS RAPAE*, L., IN N. LANCS.—It may be of interest to record that I found a freshly emerged female *Pieris rapae* at rest on stubble in a field near Ulverston on 10th November 1945. This is an exceptionally late record for this part of the world and therefore seems worth noting.—Dr NEVILLE L. BIRKETT, The Cottage, Kilner Park, Ulverston, Lancs., 4th December 1945.

NOCTUAE CAPTURES FROM YEW.—With reference to the query of Messrs Dancy and Savage, in the May number, 1945, on this subject, they ask if other collectors have found yew hedges attractive, and suggest that it is not the berries which formed the attraction. I have noticed this year, for the first time, how attractive yew trees in my garden are; but I would refer them to the *Entomological Magazine*, Vol. II, pp. 205-212, where Mr John Walton, M.E.S., describes how productive yew trees were, at Mickleham near Dorking, in the years 1831, 32, and 33; and how, in the autumn (10th October till 14th November) of the last-named year, he caught upwards of 2000 moths (feasting on the berries), many of which were rare. He gives the names of the species, p. 207, and his method of capture. The yew trees in question were on the skirts of a large beech wood in Norbury Park. Mr T. Bainbrigge Fletcher, R.N., in his note to Messrs Dancy and Savage's article evidently thought that the berries were the attraction, or at least that they could be.—Capt. ALBAN F. L. BACON, The Malt House, Burghclere.

A DECEMBER RECORD.—In mid-December *Pterophorus monodactyla*, L., was brought to me found floating in a tank of water. Does this species emerge in December? or is it hibernating?—HY. J. T.

[Hibernating. Second brood emerges about end of September and hibernates, and is often found on Ivy flowers in Autumn and on Sallow in Spring, or at sugar: the first brood emerges about midsummer. An *Oidaematophorus monodactylus* came to a lighted window here one evening in mid-December, during an unusually warm spell, but I made no note of exact date.—T. B. F.]

### CURRENT NOTE.

MORE NEWS OF AMERICAN ENTOMOLOGISTS.—My old friend, Mr James A. G. Rehn, Secretary of the Academy of Natural Sciences, Philadelphia, Pa., has sent me more interesting news of the fine work done by American Entomologists in the war.

His son and colleague, John W. H. Rehn, has been based on Calcutta, as Captain of the 9th Malaria Survey Detachment (of which the Americans at one time had over four hundred), working with the Indian Malaria Institute. He has sent home about 4000 Orthoptera and Dermaptera from Assam and Burma and thousands of other insects, and Arachnids, leeches, reptiles, amphibians and some fishes. He gathered some splendid collections in the Naga Hills and in the Hungwan Valley, north of Bhamo, in Burma. He sends the interesting information that the curious metallic earwig *Eudohrnia* certainly can pinch, in spite of its long and feeble-looking forceps.

American officers have sent home insects from the Gold Coast to the Carolines and Solomons, whatever was occurring here and there, but very important in the aggregate.

A great loss has been the death of Major Brooke Dolan, of the Army Air Intelligence, only in his mid-thirties. At the age of twenty Dolan had financed and led two expeditions to Szechuan and eastern Tibet for birds and mammals for the Philadelphia Academy, as well as shorter trips to Greenland and Mexico. He was reported dead from Chungking. Another trustee of the Academy, George Vanderbilt, who financed and led a big expedition across Africa ten years ago, has been in the S.W. Pacific for several years.

H. R. Roberts and Dr Helwig, both good Orthopterists, are Captains in the 34th Malaria Survey Detachment; they are in the Philippines, where they were through the invasion, after service in New Guinea. They have made good collections of Orthoptera. Gurney, the U.S. National Museum Orthopterist, has been a Malaria Survey Captain in the S.W. Pacific. Dr Tinkham is now in a military Government, thanks to his knowledge of Chinese, among whom for two years he was teaching, and working on the Orthoptera.

Mr Rehn himself is a fine model of activity. Over age for military service, he has been doing double, or triple, duty at home. In addition to his institutional duties, he is this year President of the Entomological Society of America, and for some years has been President of the American Entomological Society, which is the "grandmother of all existing American entomological societies." He has also been treasurer of the latter for sixteen years and was Editor for twelve. Mr Rehn comments modestly, that "it sounds like Pooh-Bah, doesn't it?" Perhaps, but not to those who know his perennial energy and wonder at his tremendous output of work. He has under his care 500,000 Orthoptera and Dermaptera, as well as 2,000,000 other insects.

He sends bad news of Morgan Hebard, who has for years been a great patron of Orthoptera and collaborator with Rehn. He is now a complete invalid with arthritis, which is tragic for so active a man, still young, well under sixty. His entire collection, which has been deposited for thirty years with the Academy, contains a total of over 250,000 specimens. All our sympathy goes out to him.—MALCOLM BURR.



## EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.

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**Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus* *elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.

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## MEETINGS OF SOCIETIES.

*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: First Wednesday in month at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1: Wednesday, February 27th; March 13th; 6.0 for 6.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppell Street, Gower Street, W.C.1: Sectional Meetings on first Tuesday and General Meetings on third Tuesday of each month, 6.30 p.m. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

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MIDDLE EAST LEPIDOPTERA: NEW FORMS AND SPECIES. VII.<sup>1</sup>

By E. P. WILTSHIRE, F.R.E.S.

The new forms and species here described were caught by the author within the last decade in Persia (Iran) and Mesopotamia (Iraq). More descriptions will probably follow, as the microscopic examination of the material proceeds. Acknowledgments are due to Dr B. P. Beirne, M. Charles Boursin, Mr W. M. T. Forbes, Brigadier Evans, and Mr Albert Zerkowitz for opinions, advice and assistance, and to the Bombay Natural History Society for the careful custody and packing of the author's 1939-42 material, which he is now able to study in New York.

Black-and-white illustrations, forming two plates, are given to illustrate the genitalia of some of the species mentioned; a third plate, in half-tone, illustrates those for which a photograph is considered also necessary for recognition. For these photos (except for one by Mr W. H. T. Tams) and drawings the author is responsible. For the gift of a microscope especial thanks are due to his uncle, Sir A. J. Curgenvin.

Some photos of larvae and pupae, illustrating an article "Early stages of Oriental Palaearctic Lepidoptera—VIII," which follows this article, are also included in the third plate. A third article follows, "New Records of Lepidoptera from Iran—II," at the end of which appear the literary references made in the two articles which precede it.

## RHOPALOCERA, NYMPHALIDAE.

*Melitaea sarvistana*, Wilts., bona species.

Described and illustrated in Wiltshire (1941) as a race of *phoebe*, W.V., the question of the specific status of this beautiful and striking new Fritillary can now be cleared up as the result of an examination of the genitalia of the two types, of true S.W. Persian *phoebe*, W.V. and a comparison of the genitalia figured in Higgins' monograph (1941). *Sarvistana* is in the *phoebe* group, but quite distinct from both *phoebe* and *sibina*, Alph. This might really have been deduced from the facies, which is most distinctive on the upper side. I published it as a subspecies because I hesitated to suppose that I had, in fact, discovered three new species in a single *Rhopalocera* genus in one year in one province!

The male genitalia of *phoebe* and *sibina* are very similar but those of *sarvistana* differ as follows:—

Aedoeagus, not flattened anteriorly, of a more regular cylindrical form. Morula differs, as shown in figs. 5, 6, and 8, Plate II.

Ringwall, lightly chitined, so as to appear transparent.

Valvae: posterior processes less spreading and with only two points, not four as in *phoebe*.

Figures 7 and 9 show the dorsal and figures 1 and 2 the lateral view of the valvae of *phoebe* and *sarvistana*. The asymmetry of the new species' valvae should also be mentioned, the right valva being stronger, with longer and more elegant points on the posterior process.

The above distinctions are based on my examination of the genitalia of both the types, the only two known examples of this butterfly. There

<sup>1</sup>The previous article, No. VI, in this series appeared in 'Ent. Rec., LVI, p. 97 (October-November 1944).

is no allotype, as originally stated, the second being a paratype; both are males.

*Melitaea gina*, Higg.

I take this opportunity to figure (fig. 3) the female genitalia of this species, since in the original description Higgins stated he could find no difference in the male genitalia from *didyma*, Esp. Fig. 4 shows the female genitalia of *didyma*, Esp., for comparison. The chief difference seems to be the taller cone below the antrum in *gina*. Dr Higgins, *in litt.*, said he would not like to assert that this difference was significant but admitted that none of his preparations of *didyma* showed quite the same development of the cone. He also told me that the male from Harir, W. Persia, figured by Peile as "*didyma casta*" (fig. 17) in the coloured plate in the March 1922 number of *Journ. Bombay N.H. Soc.* is this species. This plate indeed shows the typical underside characteristic of *gina* very well; the forewing upperside, however, is an aberration, with the submarginal chevron very underdeveloped. I find I have this species from the Elburz, thus confirming Brandt's statement *in litt.* that he got "*didyma*, O. ssp." (as he called it) from both N. and S. Persia.

*Melitaea phoebe*, W.V., ab. **fasciata**, ab nov.

This aberration is analogous to ab. *fasciata*, Skala, of *didyma*, Esp. The black discal spots are enlarged and united into a median fascia on the forewing upperside. The underside is normal. (Fig. d, Plate III.)

The type of the aberration is a male taken near Shiraz, Fars, S.W. Iran, on 12.v.40. It belongs to the Persian race which has not yet been named but is very close to mod. or ssp. *telona*, Fruhst. Presumably the new form could occur in other races. A normal example of the Fars race is also figured for comparison (fig. c).

*Melitaea consulis*, Wilts., ab. **proconsulis**, ab nov.

Upperside of both forewing and hindwing with submarginal chevron enlarged into a heavy black fascia. Between forewing nervures 3 and 4 the orange ground-colour basad of this chevron is absorbed by the black suffusion, so that the submarginal chevron or band is there united with the inner chevron or band, breaking up the orange interspaces into an apical group of three and an anal group of two. On both wings the median row of heavy black spots is obsolescent, and on the hindwing only one or two of these spots are present. I expect this abnormality of the median band occurs independently of the abnormality of the submarginal chevrons, and that *proconsulis* is therefore a combination of two aberrations. As though to compensate for the heavier submarginal chevron, the inner chevron on forewing and hindwing are lighter than in the normal female. (Figure a, Plate III.)

Holotype:—♀, 23.v.41, Kuh-i-Surkh, 8000 ft., near Shiraz, Fars, S.W. Iran. The type is a unique rather rubbed specimen, and is figured together with a male *consulis* for comparison; a typical female appeared in the original description's plate (Wiltshire, August 1941).

HESPERIIDAE.

*Eogenes alcides*, H.S., **elama**, subsp. nov.

The publication of this race rests on the brief preliminary description given in Wiltshire (December 1941) and the photo in the plate of



Wiltshire (December 1943). The following is the text of my original description prepared in 1938 but hitherto unpublished.

Above, dark brown, unmarked except for three small contiguous apical spots on the forewing in spaces 6 to 8; cilia, white.

Below, forewing, dark brown except for costa and apex broadly grey (apical spots as above; hindwing, entirely grey), with a small faint white spot in the middle of space 5; cilia, grey.

Length of forewing, 15.5 mm.; apex, rounded.

The genitalia, teste Brigadier Evans, are identical with those of *alcides*, H.S.

The typical form occurs in Asia Minor (Magnesia, Tokat, Aresh, etc.) and in Kurdistan, and differs from *elama* in having the forewing more pointed and with well-marked discal spots, and a cell-spot in the forewing. Minor subspecies resembling the typical form occur in Baluchistan and Chitral. A well-marked subspecies, *ahriman*, Christoph., occurs in Achal-Tekke; it approaches *elama* in size and has the forewing markings reduced but at least two discal spots are always present.

Type and only known specimen obtained has been deposited in the British Museum: from Maidan-i-Naftun, Khuzistan, S.W. Iran, 6.vi.38.

The name is intended to recall the ancient name for this province, Elam.

#### HETEROCERA, LASIOCAMPIDAE.

##### *Trichiura* **sapor**, sp. nov. (Fig. g, Plate III.)

This new species is the third known member of this Palaearctic genus and can easily be distinguished by its lack of markings from the other two.

Female: Antenna, bipectinated; shaft whitish, lamellae, ochreous, blackish at base.

Head and thorax, with long white and black hairs, producing a grey aspect. Abdomen, with heavy tuft of anal hairs, white predominating over grey and a few ochreous hairs.

Venation: the forewing apex comes at vein 9, not at 10 as in other *Trichiura*, sec. Seitz, but is so rounded that this is perhaps a matter of interpretation. On the forewings veins 6 and 7 are stalked, likewise 9 and 10. On the hindwing, 4 and 5 spring together from the cell; 6, 7, and 8 are free, the latter springing from the fore-edge of the cell and immediately curving boldly outwards to meet the costa at a very acute angle. Thus, except perhaps for the position of the forewing apex, the venation agrees with that of the two other *Trichiura* species. Antenna, frontal prominence and eyes also agree.

Forewing, whitish-grey, sparsely freckled with darker grey and black; palest in the submarginal area. No markings except a vague line running from the apex to the inner margin about 2 mm. from the inner angle; this line determines the paler submarginal area but is so obsolete as to be practically invisible; perhaps it is clearer in the male, which is not known to me. Underside, unmarked, with blackish scales denser towards apex.

Hindwing, similar in ground-colour to forewing, but darker grey towards termen. Underside, similar.

Fringes, long, pale, blackish near the tip, white-tipped.

Forewing length, 15 mm. Expanse, 30 mm.

Holotype:—♀, hatched 11.xi.41 from larvae found on *Amygdalus spartioides* at Shapur, 3000 ft., Fars, S.W. Iran. This locality is the site of the royal city of the Sassanian Emperor Shapur (*latine*, Sapor), hence the name for the new species. The early stages are described in greater detail in my article "Early stages of Oriental Palaearctic Lepidoptera, VIII," which follows immediately. In coll. m.

*Chondrostega aurivillii*, Püngl. (an *fasciana*, Stgr.), **feisali**, subsp. nov.

The publication of *feisali* was established by a brief description in Wiltshire (December 1941) and a figure in Wiltshire (October 1944, Bagdad). The following is my original description prepared in 1938 but hitherto unpublished.

♂, Forewing, about same size as *fasciana*, Stgr., or a little larger. Ground-colour, white, not pale brown as in *fasciana*. In well-marked specimens there is not only a brown median band but also a submarginal band (absent in *fasciana*) which proceeds from the apex and is usually more obsolete than the median. Often, however, both bands are obsolete, leaving the forewing almost pure white.

Hindwing, coloured like forewing, less strongly banded than in *fasciana*, Stgr., but in strongly-marked specimens there are two bands traceable, not one, as in *fasciana*.

Undersides; forewing, sometimes like *fasciana* (i.e. with median band clearly marked but submarginal band only clear near costa) but more often with the two bands united by a brown suffusion. Hindwing, basally whiter than outside the first band; this is so in *fasciana* too.

♀, wingless, at least 1 in. long, stout, covered with yellow-brown hairs and with a whitish anal tuft. Antenna, simple.

Herr Franz Daniel compared a paratype with the type of *aurivillii*, Pungl. He found the type more strongly marked than *feisali*, and with a light brown ground colour. Two whitish cross-lines, overshadowed with a light brown suffusion ran the same course as the cross-lines of *feisali*. The fringes in *aurivillii* were chequered light and dark brown, while in the *feisali* paratype they were white. This distinction, however, falls, since some *feisali* have fringes white chequered with brown. In *aurivillii*, again according to Daniel, the hindwing is light brown with two dark brown cross-lines, and fringes as on the forewing. The underside is similar, but stronger brown. These markings correspond to those of *feisali*, he found. Thorax, abdomen, and feet are similar in male *aurivillii* and *feisali*, though paler in the latter. The *feisali* female paratype is twice as big as Pungler's presumed allotype (it does not bear the "type" label, according to Daniel), otherwise similar. Daniel concluded that *feisali* was a large bleached race of *aurivillii*, and not a distinct species. If he is right the bleaching would denote the facies-reaction to more desertic conditions in Iraq than Palestine, a supposition confirmed by the Arabian form (see below).

I suspect, from this comparison with *aurivillii*, and my own comparison with Staudinger's type of *fasciana*, that *fasciana*, *aurivillii* and *feisali* are the same species, and each race varies somewhat in its habitat.

Examples taken by Philby in Arabia and deposited in the British Museum seem to belong to the same specific group. They are very large and completely satin-white. Travellers' accounts of red cater-



pillars swarming in *Arabia* agree with my own observations of *feisali* larvae in Iraq, at Kuwait, and in S.W. Persia.

Holotype:—♂, 31.ix.36, Haditha, Iraq (in coll. m.).

Allotype:—♀, 27.ix.37, hatched from larvae found at Qaraghan, Iraq (in coll. m.).

Paratypes:—8 ♂ and 3 ♀; 1.x.36, Baiji, Iraq or hatched 24-29.ix.37 from larvae found at Qaraghan, Iraq, or 14.x.38, Hamidiya, near Ahwaz, Khuzistan, S.W. Iran (in coll. m. et coll. Daniel).

Named in memory of King Feisal I of Iraq.

A description and photo of the larva and cocoon appears in "Early Stages of Oriental Palaearctic Lepidoptera, VIII," which follows immediately.

#### COSSIDAE.

*Dyspessa bipunctata*, Stgr., **brandti**, subsp. nova.

A brief preliminary description of this high-altitude race appeared in Wiltshire (October 1944, Bagdad). A more complete account of it and of subsp. *marginepunctata*, Wilts., which was rather too briefly described in *Ent. Rec.*, 15.x.39, p. 135, Vol. LI, follows hereunder, and a plate illustrates both (Figs. e and f) though Fig. f does not do justice to the different ground-colour of the new race.

	<i>bipunctata</i> .	<i>marginepunctata</i> .	<i>brandti</i> .
Tarsi, banded with	? Black	Black	Brown
Forewing, ground-colour	Bone-yellow	White	Smoky-cream
Forewing, termen with	No spots*	12 black spots invariably marking the nervures	12 brown spots, but those marking nervures 10-12 (i.e., costal) are sometimes black
Forewing, cell with	2 black spots*	2 black spots	2 faint brown spots, the upper obsolete
Forewing, median-spot above nervure 1	Black*	Black	Brown
Hindwing, ground-colour	Greyish-white, sometimes darker marginally	White	Smoky-grey

The sexes do not differ much in appearance, except that the ♀ ovipositor is conspicuous. Variation in size is considerable. In the Zagros I know of no locality producing transitional forms between the above races, though it would be reasonable to look for transitions between my two races at upper middle heights. In the N. Zagros (Rowanduz region) *brandti*, or something very like it, occurs above 4000 ft. and *marginepunctata* at lower level. In the Middle Zagros, *marginepunctata* occurs at 200 ft. (Ahwaz in April) and up to an unascertained height; at about 30° N., however, *bipunctata* inhabits the wooded Pireh-Zan (7000 ft.) and the scrubby Sineh-Sefid (6000 ft.), while *brandti* inhabits the barer Ardekan region (7000 ft. and higher). The Brandt brothers were the first to take and remark on this smoky high-altitude form, but did

\*At Marash (S.E. Turkey), to judge from Daniel's account, a transitional form between *bipunctata* and *marginepunctata* occurs; in it the black spotting is variable in extent, but the yellow ground-colour is retained. Perhaps this is really the nymotypical form, for Staudinger described from an inadequate series.

not name it; their locality for it was Comay (Barm-i-Firuz) near Ardekan.

Holotype and paratype of *brandti*:—♂♂, 29.vi.41, Ardekan, fruit-gardens, 7000 ft. Fars, S.W. Iran. In coll. m.

A longer series would probably indicate that the spotting in *brandti* is variable in extent, as in *bipunctata*.

#### AGROTIDAE.

*Acronycta psi*, L., *tehrana*, subsp. n. an sp. bona?

This moth differs from *psi* obviously in the larva and less obviously in the genitalia. Until *psi*'s geographical variation in these particulars is better known and until I can examine the genitalia of *solimana*, Draudt I hesitate to describe *tehrana* as definitely a new species. Draudt described *solimana* from Vandarban, 6000-7000 ft., N. Iran, as a subspecies of *psi* after examining the genitalia; he said it had "quite grey-brown hindwings, even in the male," which cannot apply to *tehrana*.

Male:—Antenna, simple, white, with black keel and bands. Palp, grey, black below.

Thorax, with dark grey central parting to patagia and black lateral edge to tegulae (as in *cuspis*, Hübn.). Forewing, as in *psi*. Hindwing, dirty white, glossy, the nervures light brown-grey and termen similarly indicated between the nervures except at the anal corner, where the white ground-colour is purer.

Underside, both wings, with discal spot large and clear, and post-median line clear at forewing costa; nervures, pale brown, fringes, chequered in blackish between the nervures. Span, 38 mm.

Male genitalia: the uncus-tip in *tehrana* has a fine point lacking in European *psi*, and the valva is more tapering; the cornuti of aedoeagus, furthermore, are slenderer and denser in *tehrana*. (Figs. 10 and 11 show the difference in the shape of the valvae). By themselves these differences might be of only geographical significance, but when considered together with the other differences (larval colouring and *cuspis*-like thorax) they suggest that a distinct species may be in question.

Holotype: ♂, hatched on 8.v.40 from a larva with a blue dorsal stripe found on elm at Tehran at 5000 ft. in 1939. In coll. m. A photo and fuller description of the larva appears in "Early Stages of Oriental Palaearctic Lepidoptera, VIII," which follows.

*Anchoscelis plumbea*, Wilts., bona species.

An examination of the male genitalia of the types of this moth, described in Wiltshire (1941) as a subspecies of *macilenta* shows it to be a distinct species, closely related to *lota*, L. It differs from the latter chiefly in the form of uncus (see figs. 12 and 13) and also in the greater length of the aedoeagus. In *lota* this is the same length as the valva but in *plumbea* it is slenderer than that of *lota* and measures 0.5 mm. longer than the valva, owing to the greater fullness of the caecum penis, or bulb.

The brick-red form occurring in Kermanshah, which is superficially so like *macilenta*, ssp. *rubescens*, Wilts. (from Syria) that I recorded it as such in Wiltshire (1940) and again in 1945, proves to be conspecific with *plumbea* and I describe it below. Appropriate corrections should be made in my 1940 and 1945 works.



*Anchoscelis plumbea*, ssp. **convergens**, forma nova.

Differs completely in colour from the nymotypical form from S. Zagros, which is buff heavily clouded with lilac grey; because of its reddish coloration it can be mistaken for *rubescens*, Wilts., which, however, is a true *macilenta* form (see fig. 14 for its uncus). It is probably a good race, characteristic of the Central and Northern Zagros, though only one specimen is known. This is yet another example from the Middle East of convergence in facies of structurally distant species (the genus *Caradrina* is especially rich in similar cases). The term "mimic" is inappropriate to these cryptically-coloured moths, and the new race's name indicates the nature of the phenomenon. In this case, the two similar forms are not yet known to occur together.

♂, Palp, with rosy-buff and a few black hairs. Thorax, rosy-buff, paler in front. Forewing, ochreous buff, thickly sprinkled with rosy-purple scales, giving a general brick hue; paler towards base. Ante- and post-median lines, faint, purer buff, with faint rosy-purple basad edging. Submarginal line, similarly but more brightly coloured, and straighter, running as in *lota*. Stigmata similarly outlined, but faintly, except lower lobe of reniform, where line is yellow and lobe filled with dark grey. Central shade, vague, grey; space between postmedian and submarginal line grey-suffused, with grey basad, yellow terminad, dots marking the nervures. Submarginal field suffused with purple-grey, the nervures indicated on it in grey and yellow. Termen, wavy, buff. Fringes, rosy brown. Hindwing, dark grey-brown, with discal spot and nervures slightly darker. Termen buff, fringes pale brown and grey. Undersides: forewing, grey suffused up to the submarginal line, with costa and submarginal field paler; fringes rosy. Reniform stigma, grey. Postmedian line clearly marked on both wings; discal spot and submarginal line also-clearly marked on hindwing underside.

Holotype:—♂, 4.xi.39, Kermanshah, 5000 ft., W. Iran. Garden with willows. In coll. m.

## HYPENINAE.

*Tamsola tarda*, sp. n. (Fig. h).

It is hoped in a subsequent part of this series to publish a full description of this small (18 mm.) interesting new species, which has the typical Zagros coloration and pattern found in so many different families (convergence), i.e., blackish or brownish bands on a creamy-white ground. Meanwhile, the photograph, for which I am indebted to Mr Tams, will serve. The unique type, taken at Rowanduz Gorge, Kurdistan, N.E. Iraq, is at present in the British Museum, as far as I know.

## GEOMETRIDAE.

*Cidaria polygrammata*, Borkh., **rosea**, forma nova.

The typical Middle East *polygrammata*, as represented by Bagdad and Tehran specimens, is very pale but well-marked; this new form, possibly a good race, and at least a very striking aberration, differs by its beautiful and durable rosy suffusion of the whole forewing, and by the slate-blue colour of the median field in the ♀ forewing. (I have no male of *rosea*; the species is sexually dimorphic, the male having the median field less marked).

Other differences:—Abdomen, strongly marked dorsally with dark brown scales on somites 3-7 (cf. Tehran form, with only abdominal tergite 3 so marked, and that weakly); a general warmer brown coloration on thorax, head and hindwing, as well as the forewing, which is rosy. The discal spot and the postmedian row of blackish marks on the nervures are weak, especially on the upper side.

Holotype:—♀, 21.iii.41; Shapur (3000 ft.), near Kazerun, Fars, S.W. Iran. Oasis biotope, riverside vegetation. In coll. m.

(To be continued—2 parts and 3 plates.)

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## THE WINTER REARING OF ARGYNNIS EUPHROSYNE.

By T. D. FEARNEHOUGH.

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A supply of ova of the " Pearl-bordered Fritillary " (*A. euphrosyne*) was obtained in June 1945 from three females taken in N. Lancashire. The ova duly hatched and the grubs were fed on garden *Viola*. The larvae reached their hibernation stage towards the end of July and stopped feeding.

Efforts were made to persuade them to feed on. The larvae, most of which tried to settle down for hibernation on the roof of their cage, were repeatedly disturbed, and a supply of fresh food was always available. They refused to eat, however, and when moved on to the food-plant soon found their way back to the cage roof. The temperature was raised artificially in daily stages to 85/90° F., 95/100° F., and 100/105° F. respectively. To the last temperature the larvae were submitted for two days, but none of them showed any inclination to recommence feeding.

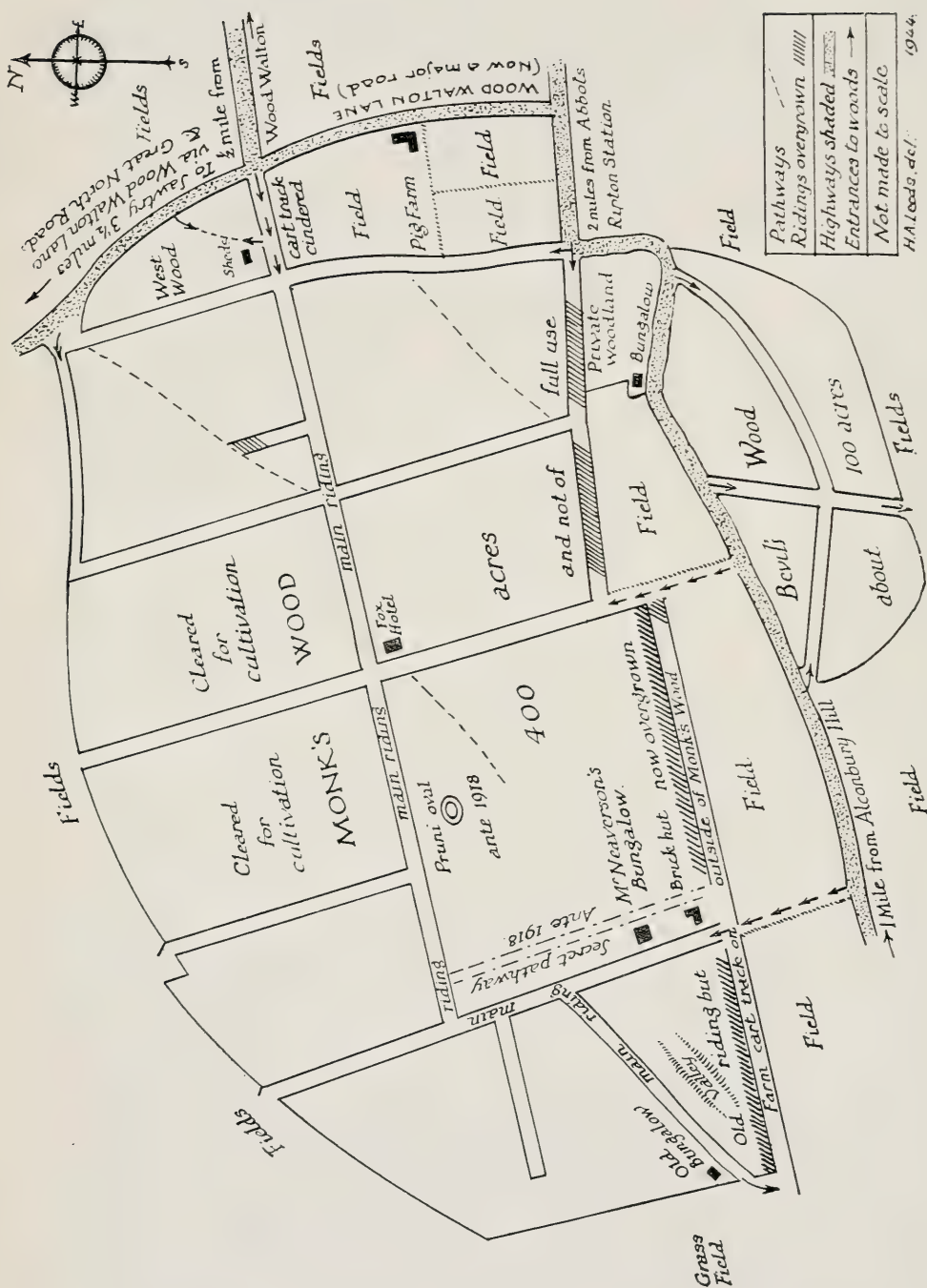
These attempts to induce the *euphrosyne* larvae to forego the hibernation period having failed, they were " cooled-off " and transferred to hibernation quarters. A clean 3 in. plant pot was ground flat on the top edge, by rubbing on emery paper, so that a flat glass cover gave good contact all round. The bottom hole was plugged with cotton wool and the plant pot was filled with crumpled-up pieces of filter paper. The *euphrosyne* larvae were dropped in and they soon searched out suitable crannies in the filter paper where they settled down for their winter's rest. The plant pot was covered with a piece of flat glass and placed in a cool cellar which has a Summer temperature range of 45/55° F.

The larvae were left undisturbed for about three months. In early November two of the larvae were taken from their hibernation quarters and warmed up to a temperature of 65/70° F. They soon became active and explored the *Viola* leaves provided. They did not appear to eat for two days but on the second day excreta were observed in the tin in which they were housed, and on the third day they were feeding heartily. They soon spun silken mats and fixed themselves for moulting. Having changed skins, and incidentally become most beautiful creatures, they fed voraciously and soon attained full growth. They both pupated on 24th November, and the butterflies, two fine typical females, emerged on 6th and 7th December.

After this preliminary success a further sixteen larvae in two batches of eight were taken from hibernation and submitted to a temperature of 65/75° F. These commenced feeding during the first 24 hours and







THE PLAN OF MONK'S WOOD.

From the 1944-45 Proceedings of the South London Entomological and Natural History Society, by kind permission of the Society.



within 3 days had all discarded their hibernation skins. They fed very rapidly and pupated in about ten days. The fourteen imagos obtained emerged between the dates 26th and 30th December.

Unfortunately, my supply of garden *Viola* was now exhausted, but a plentiful supply of pansy leaves with some *Viola* was obtained from a friend in early January (1946) and the remaining hibernating larvae—about 40—were warmed up. These soon commenced feeding and some were eating within a few hours. In this batch of larvae the mortality was high and about half of them succumbed to diarrhoea. The only obvious cause of this high loss would seem to be the change in food plant. The surviving larvae pupated during mid-January and the butterflies emerged between 22nd and 26th January.

From the original mixed batch of 80 *euphrosyne* ova, 36 imagos were reared. The result could have been much better for part of the loss was due to experiment. One large source of loss was the heating of the larvae prior to hibernation to above 100° F. It is also likely that had the original supply of food-plant been available, the high mortality in the last batch could have been avoided. Of the 36 imagos reared only two were crippled and these but slightly. The ratio of males to females was 16 to 20. No variation from type was obtained.

The larvae of *euphrosyne* require a resting (hibernation) period before they can complete growth and under natural conditions this must be of about eight months duration. It has been easily reduced to three months as described above, and it seems likely that the resting period could be still much further lessened by suitable manipulations of temperature. The occurrence of natural second-brood examples of *euphrosyne* might be expected to result from the sequence of an early Spring followed by a cold Summer and a hot Autumn spell.

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## BUTTERFLY COLLECTING IN WOOD WALTON, HUNTS., AREA, AND ON A VISIT TO THE CHILTERN HILLS DURING 1945.

By H. A. LEEDS.

(Plate II.)

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My collecting at Wood Walton, Hunts., was marred by illness during the spring; whilst further damage to the house by a crashed plane and explosion of its bombs on the railway embankment, in early May, necessitated the removal of most of my collection, and the work entailed in its arrangement took up so much of my time that no net was taken out until 14th July when, after six years' absence, I arrived near Princes Risborough for a tour of the Chiltern Hills, returning home on 28th July.

In the Wood Walton area January had considerable frost and occasional snow, but milder conditions in February and March conduced to an early season, and on 12th April some whitethorns were in blossom and blackthorns well leafy. The next day continued as the third of hot sunshine and many flowers appeared on Horse-chestnut trees. Plum blossom had finished, but apple trees were covered with bloom; the sunny weather continued until 21st April, when the temperature fell and sharp frosts occurred on 23rd, 24th, and 25th, and on 29th fields

were well covered with snow and the frosts extended into 4th May. The fruit crop in low places was almost entirely ruined, but fair crops ensued on more exposed and high ground where less moisture accumulated and there was insufficient to cause a coating of ice, which is so fatal to fruiting. No doubt *pruni* larvae were again depleted by the frosts as two collectors only obtained one larva when beating in Monk's Wood, whilst Dr L. J. Newton, of Alconbury Hill, saw no *pruni* flying in June, but noticed one *camilla* on 16th, and two others later in Monk's Wood, whilst he met with several in Upton and Aversley Woods. Dr Newton attempted but failed to net an *iris* male in Monk's Wood in July.

Prior to my visit to the Chilterns I had not entered Monk's Wood and my observations were limited to the gardens or short walks without being so complete as formerly. Possibly the following may be of interest as records.

9th April, 2 male *rapae* and soon increasing; 16th, 1 male *brassicae*, 2 male *cardamines*, and 2 or 3 *argiolus*; 21st, a male *aegeria*.

7th May, several *megera* and *pamphilus*; 8th, *tages* and *malvae*; 11th, *euphrosyne*; 19th, a male *venata* (*sylvanus*); 21st, *agestis* (*medon*).

12th June, 2 fresh *urticae* and a male of both *jurtina* and *icarus*, the former two soon became common, but *icarus* scarce; 20th, 2 *T. quercus* and a male *aglaia*; 21st, several *galathea*; 23rd, a few *w-album* at an elm plantation.

3rd July, about 8 *c-album*; only 3 of this species were seen in next brood at Wood Walton, viz., 6th, 7th and 15th October. Mr W. Quibell informed me "They were very plentiful at Brampton, Hunts., in gardens and on ripe blackberries." 6th July, 2 *tithonus* and soon increasing.

In visiting the Chiltern Hills I was anxious to see if during the war much alteration had happened and it was my intention to survey as many of the old *coridon*, etc., places as possible during a fortnight; some of these are very small and require a long walk to reach them from a train or bus. But I found both services were much restricted, and it was uncertain whether room could be found on a bus. The weather also was a factor and after allowing me time to visit Kop Hill and examine about 20 fresh-out male *coridon* on 14th July, a tempest commenced in the early evening and continued with a deluge of rain for about 10 hours. This and a wet Monday morning retarded emergence, but mostly fine weather ensued.

17th-25th July, the last three of these days being very hot, with *coridon* males increasing in number, and 30-40 females commenced on 25th. This completed my tour, as the next two days were wet. Of course, in the first week not much could be expected, but no breeding ground was devoid of male *coridon* and the fewest were 3 at Halton Hill. Formerly this was my favourite place in the Chilterns and produced some nice aberrations of *coridon*, *icarus* and *agestis*, the semi-circular wide and mostly level grassy pathway, situated partly up the hill, provided an easy and long promenade amidst the butterflies. Most of this pathway still remains, but the hill above it has a dense covering of coniferous trees, planted a few years after 1918, whilst a field on the lower slope, where *coridon* and *icarus* bred, has been ploughed during the last war and was producing a very thin crop of wheat. To-



wards its farthest end from Wendover the pathway—now narrow and rough—leads to an old clearing in a wood which presented a beautiful appearance, golden and fully-flowered clumps of Ragwort interspersed long and slender grasses whilst in the background this was set off by a flowering surround of Rose-bay Willow-herb. The Ragwort was frequented by a few *phlaeas* and many *jurtina*, *io* and *urticae*; an ab. *polaris*, Staud., of the last was obtained; also a postdix-transformis male upperside *jurtina* in perfect condition, the entirely bleached right hindwing contrasted strongly with the other three dark wings.

Actually, apart from the field at Halton, I was pleased to find that no *coridon* ground of material consequence had been ploughed. A former flowery field, in Oxon., where *icarus* bred, was destroyed; *coridon* often used to fly over it, but their food-plant, "Horse-shoe Vetch," *Hippocrepis comosa*, grows on the adjacent hillsides and hollows from which a few *coridon* had emerged. My tour was too early for *icarus*, and I did not reach Berkshire. The slopes at Cadsdean are much overgrown with bushes, but several male *coridon* were out on the nearby Pulpit Hill. The fields between that hill and the Great Kimble road, formerly arable, are now well covered with grass as the military have been in possession during the war. This in time may enlarge the breeding area for *coridon* as the whole surface, being chalk, is conducive to the slow spread of the larval food-plant.

Everywhere the old footpaths remained, and as I traversed them all the hedges were frequented by *argiolus*; they were more widespread and plentiful than I have ever known, but I could not find one worth retaining; whilst *tithonus*, somewhat scarce, only yielded one with extra spots, viz., a female upperside *bipupillata*. In every direction *brassicæ* abounded, more so than *rapæ*; these pests doubtless had a quota of immigrants.

Among the *coridon* kept were the following:—Males, uppersides pallidula; caeruleo-infralavendula; lavendula; pallidula-viridescens-ultraalbocrenata; and a well scaled pulla; undersides, fuscescens; pallidula-discreta; basijuncta; limbojuncta; I-nigrum-postobsoleta; and a sinisdiscoidealjuncta, antidex-discoelongata, postcaeca. Female underside, fulvescens-arcuata.

On returning to Wood Walton I found that most extensive fires had destroyed much of the herbage along the banks of the railway. An unburnt portion produced many *icarus* on 4th August and afterwards, but I kept none of them as they were so ordinary. Odd *icarus*, taken en route, included a nice male underside obsoleta-postfowleri; and a female underside confluens. A female *betulae* major, taken in the garden, 18th August, measured 42 mm. Only two others were seen, the last being as late as 6th October; it was still active, but the usual orange patches were faded to cream. A collector visiting this district, 18th-22nd May, only beat 3 *Thecla quercus* and no *betulae* larvae; the scarcity of the latter is caused by the continued uprooting of young blackthorns, which are much more used for depositing ova than the older bushes. The females will fly a long way to find young blackthorns; watching a row of them, a few years ago, in a field on the north side of Monk's Wood I saw 3 females arrive and apparently deposit. This place was visited the next May for beating, but I was thwarted as all the blackthorns had tangled wool on them from a flock of sheep and

lambs which occupied the grassfield. The tray was used without success and doubtless all the *betulae* larvae were brushed off by the sheep and perished. Just opposite in the next field a lesser quantity of young blackthorns yielded a few larvae. Probably the young leaves on the lower branches of oaks were again destroyed by the severe frosts, as so very few of *T. quercus*, or other larvae, would be found within reach when beating.

The 9th, 18th, 19th, and 21st September, also at its end, had hot sunshine, otherwise it was a dull month. On favourable days *cardui*, *urticae* and *io* were abundant, *atalanta* and *pamphilus* added some interest, but no *croceus* were seen in clover fields. A few *Macroglossum stellatarum* appeared in gardens. I had hoped for a good quantity of *phlaeas* in a third brood; 2 fresh were seen on 18th, 10 on 19th, and 16 on 21st, and very few afterwards, but, actually, when making a survey, it was found that the extensive cultivation had left very few docks for the larvae.

October, except for fog on 4th, and strong gales with some heavy showers 21st-26th, was the best month of the year for walks in delightful warmth and sunshine. A third brood of *megea* occurred and a perfect fresh female, also a *pamphilus* were seen as late as the 30th. Extraordinary numbers of *urticae* visited gardens, with fair quantities of *io*, *atalanta* and *cardui* during the month, but signs of age appeared on practically all of them until the 6th, when some perfect *atalanta* turned up and were joined by others equally fresh for some days. On the 15th, and after, a few fresh *cardui* arrived.

Variation in all was so poor that only an upperside *atalanta*, with 6 white spots (instead of 5) in the row *above* the red band on the left forewing, was taken. Actually there are 7 spots on this wing and 6 on the right forewing, as both wings contain the more common white spot in the band; the rarer extra spot is situated between the fifth and the band spot.

Mr Quibell informs me "That he saw a perfect *argiolus* settled on an ivy leaf, at Brampton, on 17th October." This is evidence of a third brood, and certainly *napi* and *rapae* had three broods, some of the latter continuing throughout October, but *brassicae*, formerly very numerous, almost disappeared then, leaving the green vegetables with swarms of their larvae.

After reaching the end of the 1939-1945 war, it is pleasing to record that no woods in this district, nor any plantations of consequence, have disappeared. Monk's Wood has only lost its two minor clearings of about 30 acres and they have not been cropped this year. Adversely, all the rough and flowery fields have been ploughed, and nearly all the useful pathways destroyed.

My moths were not sorted until 1938-39, and the series considerably curtailed, so that if better specimens from other parts were owned, some species from this area may have been thrown away. When my collection of moths left me this year it contained 333 species, obtained within an area of 3 miles from Monk's Wood or taken in that wood. They are ticked off in a "Text Book." Major Stuart Maples, when in residence on a purchased plot of Monk's Wood, obtained about 30 other species (but much less in total than mine); these with 3 other kinds, which I have known to occur, equal 366 species of the *Macro-Heterocera*.



Actually I almost ceased collecting moths after about 1920; they were only obtained by week-ends, etc., visits, and as every year additional species were taken, this quantity, in such a former prolific area, cannot be considered as complete for there was not time to explore all the woods and countryside in the 3 miles radius mentioned.

The ownership of the Monk's Wood is again complete as Mr H. Neaverson, of Peterborough, has now (1946) bought the southern strip of woodland, facing Bevills' Wood, together with the bungalow which Major E. Maples erected.

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## NOTES ON REARING ARGYNNIS CYDIPPE (ADIPPE).

By R. M. PRIDEAUX.

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On 23rd July 1944 a female was captured near Westerham, and confined in a roomy cage of net, stretched over supports in a flower-pot, in which was planted dog- and sweet-violet roots. Enclosed also were flowers of knapweed, sprinkled with weak glucose solution, these flowers being the chief attraction to the butterflies in the open. The specimen was thus given all that she could want except, of course, liberty, and that was also accorded her when, after a few days she had laid sufficient ova for my purpose, and was then released to deposit the remainder in freedom.

Most of the eggs were laid on the net itself, the coarse mesh of which enabled the insect to place them on the outside of the fabric, from which they had, subsequently, to be cut, individually. None were laid on the future food-plant, but a few were placed on the brown involucre of bracts at the base of the knapweed flower-head, and a few on the bent twigs that supported the net that was tied over them.

These eggs were placed in a small black gauze-covered tin, which enabled them to be inspected from time to time; exposed to all changes of temperature during the winter, in an out-house, but sheltered from actual rain or snow.

The larvae, as is well known, are completely developed within the shell, prior to hibernation, and they began to hatch in the following March, which, I suspect, was rather earlier than would have happened, unsheltered, in nature.

The eggs are pale yellowish when laid, but soon darken. The young larvae are brown; they were offered flowers and leaves of *Viola odorata* and the pale mauve, early-flowering narrow-flowered form or subspecies of *V. canina*, and, from the outset, preferred the former, flowers only, and no leaves were eaten until 12th April. The larvae never at any stage, rested on the living food-plant; but, while very young, crept into the withered corollas of *V. odorata*; though never feeding on the floral organs.

Flowers of the white variety were used, as the tiny caterpillars were more easily seen, when the food-plant was changed. As the sweet-violet does not grow on the sandy common where *adippe* was taken; I am inclined to believe that the later-flowering "dog" violet (*V. sylvatica* ?) with the broad deep-purple blossoms may be its natural food-plant; as these were readily eaten when *V. odorata* flowers were over. Buckler

(*Ray Soc.*, p. 65), who never seems to have reared the butterfly to maturity, even questions whether the "dog-violet" is its natural food-plant: it seems rather a question of "which"? His portraits of the larva are admirable, but the plate cannot, of course, do justice to the pupa, the greenish-gold spangles on which are the most lustrous I have ever seen on Argynnid or Vanessid chrysalids. Another *Viola*—*V. tricolor*, the field-pansy, was also offered the larvae, but they had no use for it.

After all *Viola* flowers were over, the larvae fed freely on the foliage of any species I gave them, but the large fleshy leaves of the garden sweet-violet were mostly chosen, as lasting well in water; as previously mentioned the larvae never rested on their food, except during a meal but preferred dry brown leaves or twigs.

They are usually sluggish, but when once alarmed, can make tracks for safety, as Buckler points out, at a pace that an Arctiid larvae could hardly rival. After the last moult, they are very handsome creatures, getting rather dingier towards maturity.

The silk pad for pupation is fairly substantial, and may be spun amongst its food, or on the lid at the top of the cage in the usual Vanessid fashion.

The first to pupate was on 29th May, emerging on 21st June, and it and all the subsequent ones were males, until 8th July, when the females, far fewer in number, began to emerge. The pupae are nervous and irritable, and begin wriggling violently when their cage is touched; these motions persisting on stimuli, until emergence.

The resulting butterflies were all fine, large examples; the black spots and markings preponderating in size, over typical specimens. Perhaps I should add that the larval cages were glass cylinders, with card-board bottoms and wire-gauze tops; they were placed on a window-sill (always a little open) and screened from direct sunshine, in a room where a fire burned in chilly weather. When once the very troublesome early stages are passed, rearing *A. adippe* seems to be a fairly straightforward business.

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### COLLECTING NOTES.

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THE FLASHING OF FIREFLIES.—I have received a most interesting letter from Brigadier A. W. G. Wilder, describing an incident that is well worth adding to the observations on the flashing of fireflies that appeared in the *Ent. Record* some years ago. The Brigadier writes:—"I was lucky enough to see this phenomenon in Singapore about four years ago. I was taking part in some night manoeuvres in a mangrove area and searching for a lost infantry post. Suddenly I saw what at first I took to be a signalling lamp calling up and illuminating a bush. Closer inspection showed that the bush was covered with several hundred fireflies (*Photinus pyralis*?) flashing in unison. The rate was just that which one would expect from a signalling lamp, 'on-off-on-off,' in nearly equal periods at about the same pace at which one would say the words slowly. I was in the area for well over two hours and they were still flashing when I left. A brother officer has told me that he saw a similar phenomenon in the north of Malaya."—MALCOLM BURR, Istanbul, 17.ii.45.



NOTES ON *V. ATALANTA* IN 1945.—Hibernated examples began to appear earlier than usual. On 13th May a ♀ was seen ovipositing. One of her eggs was taken: the larva hatched in a week, and the imago was disclosed on 5th July, at which date obviously fresh specimens were seen in the open. As these butterflies had plenty of time for all their ordinary activities of nectar-searching, mating, and egg-laying before the late Summer and early Autumn, may it not be reasonably assumed that *atalanta* is at least partially double-brooded in this country? although these late specimens which appeared here and elsewhere in such vast abundance may have also in part been the direct progeny of later migrations. Not a nettle (always here about) but was tenanted by ova, larvae of all ages and pupae; what is far rarer in the writer's experience, almost entirely free from the attacks of parasites. The last specimen emerged in captivity on 16th October.—R. M. PRIDEAUX, Brasted Chart.

POCOTA PERSONATA, HARR. (APIFORMIS, SCHRK.) (SYRPH. DIPT.) IN NORTH KENT.—Whilst on a visit to Eltham in the spring of 1945 Dr B. N. Blood took me over to Bexley Woods where on 16th May I had the good fortune to capture a single specimen (male) of this scarce Syrphid. On reference to Dr B. M. Hobby's paper on this species (*Ent. Mo. Mag.*, 76, 238-244, November 1940), it seems that it has not been previously recorded from Kent.—H. AUDCENT.

HIBERNATION OF *TUBIFERA TENAX*, L.—It may be of interest to record an unusual hibernating place of drone flies. My friend, Mr H. E. Hammond has kindly passed on to me a male and female of *Tubifera tenax*, L. (Dipt. Syrphidae), which were found on 1st January 1946, at rest beneath the dried outer scales of stored onions. The insects were both alive but very sluggish in their movements.—CARTWRIGHT TIMMS, 524a Moseley Road, Birmingham, 12, 10.2.46.

NOTES ON LEPIDOPTERA IN LATE SUMMER AND AUTUMN.—The following records of Lepidoptera during the late Summer and Autumn may be of interest:—"Whites" have been decidedly uncommon, since early September, the last dates being—*P. brassicae* 29th September, *P. rapae* 16th October, *P. napi* 27th September, *G. rhamni*, very patchy, the latest on 12th October. Several *C. croceus* appeared in August, but none since. *A. urticae* common, last noted 14th November. *N. io* has been scarce, only odd specimens appearing up to 17th October. *V. atalanta* very common: the last was seen on 5th December in fresh condition. *V. cardui* has turned up in fair numbers, with a late straggler on 12th November. *P. c-album* less in evidence than usual (the apple crop failed, and they missed their sweetmeat). *P. megera* absent, but *P. aegeria* abundant right up to 18th October. *M. jurtina* fairly frequent, and as late as 4th October. A solitary *C. pamphilus* on 12th September.

With regard to the moths, *M. stellatarum* was seen on most days at flowers of *crucianella*, with a late record on 12th November, and *P. gamma* abundant at the Michaelmas daisies until 7th November. Moths recorded at lighted windows included:—*A. circellaris* from 2nd to 12th October. *A. xerampelina*, one on 28th August. *T. aurago*, one on 6th October. *D. caeruleocephala* from 4th October to 3rd Novem-

ber. *A. lychnidis* and *A. helvola* on 6th October: *L. clavaria* on 12th October. *C. pennaria* from 13th October to 7th November. *M. oxycanthae* on 14th October. *E. defoliaria* from 14th October to 6th December. *L. pallens* on 3rd November (surely a very late date). *B. sphinx* from 8th November to 1st December. *P. populi* first arrived on 24th November, also *O. brumata*.—A. H. TURNER, Forest Drove, Bickenhall, Hatch Beauchamp, Taunton, Somerset, 10th December 1945.

FOODPLANTS OF *EUPROCTIS SIMILIS*, FUES. (*PORTHESIA AURIFLUA*, FAB.).—On 29th July my wife brought me a blade of *Poa annua*, L., on which was a batch of eggs resembling those of *E. similis* and thickly covered with mouse-coloured "fluff." The eggs hatched on 31st July, and, although the larvae seemed to me to be undoubtedly *E. similis*, I supplied them with *Poa annua*, on the upper parenchyma of which they fed gregariously. At the first moult they assumed their typical plumage, but I continued to supply them with *Poa*, to which I added leaves of *Urtica dioica*, L., *Plantago major*, L., and *Rumex obtusifolius*, L. About half the brood at once adopted the nettle, the rest continuing with the grass. The plantain and dock were untouched. After the second moult they were given *Prunus domestica*, L. Though found perhaps most frequently on hawthorn this species seems to feed on all native deciduous trees and shrubs; but I have seen no record of it feeding on a grass and herbaceous plant.—P. B. M. ALLAN.

*RHODOMETRA SACRARIA*.—As regards the discal dot on forewing of *Rhodometra sacraria*, Prout (in Seitz, *Macrolep. Pal.*, IV, 153, 1914) says "usually also with a minute discal dot and occasionally with a rosy mark along the median vein from the second submedian to the end of the cell." Culot's figure 300 on t. 15 shows this discal dot, also indicated in his fig. 299, and the dot is shown still more clearly in Spuler's figure (*Schmett. Eur.*, t. 65, f. 17). Of 21 examples in my collection, 11 show the dot and 10 lack it: from an old German Collection (European, without exact data), 1 with spot, 1 without; from Pusa (N. Bihar, India), 2 with spot, 4 without; from Malta, 1 with spot; taken at sea 95 miles off N. Coast of Egypt, 2 with spot, 1 without; from Hyères (S. France), 5 with spot, 4 without. In *sacraria* there is great variation in the colour of forewing and of markings. The crimson markings may be replaced by fuscous (or even blackish) either wholly or along the outer edge of the oblique streak running to apex, and the ground colour varies from almost whitish through pale yellow to a dull sandy-brown.—T. B. F.

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### CURRENT NOTES.

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MR F. V. L. JARVIS, of 21 Shirley Avenue, Sutton, Surrey, will shortly be demobilized and wishes to continue his biological studies commenced five or six years ago. He wishes to obtain *Polyommatus icarus* set or unset from Ireland, Scotland, and Hebrides. Can any one help him? He is willing to exchange or purchase.



THE *London Naturalist* for 1944 was published late, but its contents are none the worse for that reason. As usual the "Entomology for 1944" and the "Plant Gall Records" for the same period were well summarized by H. J. Burkill. But the chief interest in the recent publications of this Society, or should I say union of small sectional Societies, viz., The details of the two Ecological Surveys taken up by the various members working together, one South of the Thames (Bookham Common) and the other North of the Thames (Chingford), are the main features of this year's Proceedings. The former contains an admirable map of the area under survey. Each member reports on the natural objects in which he is interested: Coleoptera, birds, dragonflies, water-molluscs, etc. The map, a folding one, gives the woods, ponds, plains, levels, paths, roads, etc., and what is very important, the local names by which the various spots, features and directions have been known locally for many years. The Survey of the Chingford area, "the Cuckoo Pits," is dealt with in a similar way. Short Notices are given of meetings and other activities of the Society and of its Sections; the rest of the work of the Society during a very trying period is briefly recorded.

To those interested in the question: "How Long do Entomologists Live?" as introduced in *Entomological News* (Amer.), LVI, 1945, pp. 189, there is a continuation of the subject in the November number of the same journal, pp. 246.

THE fine little magazine of Belgium, *Lambillionea*, seems to have fallen into its old pre-war stride. No. 1 (January 1946) of Vol. 46 has come to hand. There are 16 pages of short papers and entomological notes in its coloured cover, with exchanges and the usual matter. We wish it well and success to its new chief, M. L. Berger. Well we remember the dear old man Lambillion, from whose name came the title of the magazine first known as the "Revue Namuroise."

IN August No. 1945 of the *Canadian Entomologist* is an article on the Section of the unicolorous brown winged species of the micro-genus *Coleophora* (*Eupista*) of N. America.

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## REVIEWS.

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THE HYMENOPTERIST'S HANDBOOK, pp. 160, price 10/6. (*The Amateur Entomologist*).—It is a pleasure to recognize a Handbook to an Order of Insects other than those numerous and long existent guides in one form or another to the Lepidoptera and Coleoptera. The Amateur Entomologists are doing a real good work in booming a study of the Hymenoptera. Nearly all the works written on British Hymenoptera have been on the Bees; in fact, the Honey Bee dominates all the work which has been done hitherto, and there has never been a real introductory treatise on this great Order as a whole. No one author could deal with all the definitely separate sub-orders, which require diverse methods of study. This work is a most praiseworthy attempt to assemble a group of practical workers who have chosen different sections of the Order. The Sawflies, the Parasitica, the Ants, the Bees (Solitary, Bumblebees), the

Chalcids, the Aculeates (generally), the Gall-wasps, the Ichneumons, the Cynipida, and the Honey-bees—at least twenty authors have been called in to assist in the task. The notes on the practical work of collecting, observing, experiment, breeding, setting, rearing, etc., all are dealt with by those who have given accounts of their methods, differing much in the varied sub-orders. More than 180 figures are given, many compound ones, mostly of home-made apparatus, in the 160 closely printed pages. There is an adequate Index and there are several simple keys to some of the groups. The term which can apply to the whole work is “thoroughly practical.” Even titles of works which may be of use and a glossary of general terms used in descriptions are given. The Society is to be congratulated on its achievement in forwarding a new missionary effort to attract new students to an Order of Insects where much remains to be done.—HY. J. T.

PROCEEDINGS AND TRANSACTIONS OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, xxviii + 96 pp., 5 plates (2 coloured), and many text figures; 10/-.—In spite of its very late appearance this well known publication shows a real advance in attractiveness over its predecessors. As usual, the first 28 pp. deals with the business position of the Society. All the Funds are in a healthy state with small balances. The membership is gradually increasing. The Report of the Council is most encouraging; that of the Treasurer very satisfactory. The chief incident which has affected the Society during the year was the loss of the very popular Hon. Curator, Sidney Ashby, under whose care the Society's Reference Collections have grown to be a real and most useful asset in the efficiency of the Society in its aim of helping its members individually. The Curator was in his 81st year, and had held his post since the death of W. West, of Greenwich, in 1920. Plate I is a very good portrait of the Curator. We feel sure that a good successor has been chosen in F. J. Coulson.

The Abstract of the Proceedings at the 11 Meetings of the Society shows that the matters brought before this restricted number of meetings was of a very high order. In fact, the Abstract has brought the volume beyond the level of most of those issued for many years past. The outstanding article is that on “The genus *Lithocolletis*,” perhaps the most interesting and attractive group of Micro-lepidoptera we have in this country. This was prepared by the President, Mr S. N. A. Jacobs, and was admirably illustrated by a beautiful coloured plate of all the British species, 49 in number; in the text describing the species are b. and w. figures (enlarged) of all these. The foodplants of each species are given with details of the mines made by the larvae; the continental and world distribution is also discussed. Methods of breeding are added, the whole forming a permanently useful *vade-mecum* to all Microlepidopterists. Another article on the same lines deals with the “Micro-genus *Mompha*,” by Mr S. Wakely. The coloured plate gives figures of the thirteen species, including the very rare *M. nodicolella*, of which a figure of the genitalia is in the text. (omitted by Pierce and Metcalfe.) Both the coloured plates above were drawn and coloured by Mr Jacobs and the plates admirably produced by Messrs Siviter Smith. Mr H. A. Leeds contributed an account of the famous



"Monk's Wood," with a capital map. Other papers treat of "Gregarious Larvae," by Rev. Canon Edwards; "Mushrooms and Toadstools," by W. H. Spreadbury; "S. African Galls," by M. Niblett; "Red Letter Days," by Col. P. A. Cardew; and "British Plecoptera," by E. E. Syme; while there is a b. and w. plate of a striking variety of *Heodes phlaeus* exhibited in 1943. The whole a great credit to the Secretary and others who assisted in its production.—HY. J. T.

A CHECK LIST OF BRITISH INSECTS, by G. S. Kloet and W. D. Hincks. Demy Octavo, pp. i-lx + 1-483, December 1945: Kloet & Hincks, 322 Wellington Road North, Heaton Chapel, Stockport. Price £2 12s 6d [£2 2s 0d to Subscribers before 30.iv.1945].

In the earlier days of Entomology, now over one hundred years ago, the Entomologist, like Francis Bacon, took all knowledge as his Province as regarded the Insect World, together with such side-lines as Spiders, Mites, Ticks and Crustacea, and had endeavoured to meet a demand for a complete list of the Insect Fauna of these Islands. The earliest such List was published in 1770 by J. R. Forster as *A Catalogue of British Insects* and a facsimile of its Title-page is given in the present Check-List. In 1829 both J. Curtis and J. F. Stephens tackled the same problem, Curtis in a *Guide to an Arrangement of British Insects*, which was a mere List of names, and Stephens in a much more comprehensive *Systematic Catalogue of British Insects*, which ran to over 800 pages and gave bibliographic references to the names mentioned, so that it is still useful to the modern student. Since 1829 no complete List of all the British Insects has been published except for F. O. Morris' *Catalogue*, which was issued in parts, 1865→ (to 1867 ?), and of which few copies seem to have survived: probably Morris, being a "popular" author, fell between two stools in this attempt, his *Catalogue* being a "dry-as-dust" publication to his regular subscribers whilst the more scientific workers looked askance at such a work from his pen, even if they ever heard of it. So it is not before its due time that the present *Check List* has put in an appearance, which has been looked for and is now warmly welcomed.

The Summary on p. 430 shows that the List contains 4714 genera and 20,023 species with claims to an established position, together with casuals estimated at 53 genera and 220 species in addition—but the "casual" List might be swollen to almost interminable length by the inclusion of all the exotic Insects which are at times imported with fresh fruit, etc., but which have no real claim to inclusion. With over 20,000 species to deal with, it is little wonder that the List runs to 429 double-column pages and only those who have actually attempted to do such work can have any slight comprehension of the labour involved in its compilation, the consultation of literature and the laborious checking of every item for the mere preparation of the manuscript. Every specialist will turn to his own group and will perhaps be able to find something with which he disagrees: so long as that is a matter of personal opinion, such as the validity of certain names or the grouping or constitution of genera, he will still be free to maintain his own ideas; if the critic finds matters of fact requiring correction, he will do well to read the Note on p. 434 and communicate with the authors, who will

appreciate such information. It should be needless to add that, *before* using the *Check List*, the *Addenda* and *Corrigenda* (pp. 431-433) as well as the loose slip of *Errata*, etc., should be entered up. The text is remarkably free from errors and the Printers especially are to be congratulated on the excellent *format* of the book, especially in view of present-day difficulties.

The fact that various sections of the *Check List* have been prepared by, or following, different authors with differing views on certain points of Nomenclature has led to some inconsistencies, as pointed out on page xxvi in the case of the Diptera, where whole groups are involved, or even in the case of single species, e.g., *Tortrix fasciana*, Linn. 1761, which we find on p. 99 in the Noctuidae as a prior name of *pygarga*, Hufnagel 1766, and again in its correct place on p. 126 in the Eucosmiidae as *Pammene fasciana*, Linn. 1761 = *juliana*, Stephens 1835. Most of the genonyms in the later part of Hübner's *Verzeichniss bekannter Schmetterlinge* are shown as "1825" although they have always been taken hitherto as published in 1826 and there is not a shred of actual evidence that they were published earlier. Similarly, the names in Fabricius' *Genera Insectorum* seem to be all mis-dated as "1776," whereas this book appeared in 1777: its Preface is only dated 26.xii.1776 and Fabricius himself (*Philosophia Entomologica*, p. 6) dated it "1777." The mis-dating ("1812") of Haworths' genonym *Gracillaria* has led to a regular mix-up on pp. 136-137.

The List of Subscribers (pp. 479-483) contains the names of many Public Libraries but of a relatively small number of Entomologists, to whom this *Check List* should prove not merely useful but an actual necessity, for nowadays no one can really claim to be an Entomologist, in the sense of being a student of all Orders of Insects, and few of us know much about any group outside of our own particular corner. Whether the would-be student of the large "neglected" Orders, such as the Diptera and Hymenoptera, will be more repelled or attracted by the prospect of tackling such large groups, I do not venture to say, but we may be sure that the paths of any earnest student should be smoothed by having for reference at least an outline-map of a little-known territory which he aspires to explore.

On p. xiii the authors state that the labour and effort required to produce the present List could not be repeated to prepare a more exhaustive and critical second edition. But it may be hoped that the authors may reconsider their decision in course of time, especially if all, who can do so, will assist by offering any constructional suggestions for improvement.—T. BAINBRIGGE FLETCHER.

The above Work is, by far, the most important and useful book of reference which has been published this century, and should be found in every Library in the country. The compilers, Mr G. S. Kloet and Mr W. D. Hincks, have done their task conscientiously and well, and must not be blamed for the errors, mainly of judgment, made by those who made the Lists they have used. We hope that we shall get opinions on some of these by students of the chief Orders.



## EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr Hy. J. TURNER, "Latemar," West Drive, Cheam.

**Wanted**—American Hesperiliidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.

**Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.

**Wanted**.—*Lycaena* (*Heodes*) *phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. *Duplicates*.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.

**Wanted** for cash or exchange many species of ova, larvae or pupae, especially local forms and *A. grossulariata* from different localities, also Seitz Vol. 1 and Supplements to Vols. 1-4. Offers also, Tutt's *Practical Hints*, Parts 1 and 2, Buckler's larvae, Vols. 1-6, and Tutt's *British Noctua*, Vols. 2, 3, and 4.—Dr J. N. Pickard, F.R.S.E., 36 Storeys Way, Cambridge.

**Wanted**.—Various monthly parts of *Entomologist's Record* for 1914, 1915, 1916, 1917, 1919, and 1920. Please report any odd monthly parts (in wrappers as issued) prior to these years.—P. B. M. Allan, 4 Windhill, Bishop's Stortford, Herts.

**Wanted**.—Males of *Morpha menelaus*, *M. didius*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.

**Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.

**Wanted** for purchase or exchange, pupae of *Smerinthus ocellatus*.—E. S. A. Baynes, F.R.E.S., Monkshatch Cottage, Compton, Guildford.

**Wanted**.—The two volumes (bound or in parts) of the second "Deuxieme Partie Geometres only of Culot's Noctuae et Geometres d'Europe."—Brig.-Genl. B. H. Cooke, C.M.G., C.B.E., D.S.O., F.R.E.S., 86 Osborne Road, Windsor.

**Desiderata**.—No. 8 Black Pins for Cash or Exchange.—A. J. Wightman, "Aurago," Pulborough, Sussex.

**Wanted**.—Set or in papers, perfect specimens of *Lycaena arion*, *L. corydon* var. *syngrapha*, *Polyommatus dispar* (British or Continental), *Thecla betulae*, *T. quercus*, *T. w-album*, *Nemeobius lucina*, *Vanessa polychloros*, *Pieris daphnice*, *Leptosia sinapis*, *Colias hyale*. In exchange, British, Indian, Australian, African and American Rhopalocera, in papers.—C. B. Antram, Rivermead, Keynsham, near Bristol, Som.

**Wanted**.—Perfect specimens, unset, of *Morpho papyrus* in exchange for British Butterflies, set or in papers.—Chas. B. Antram, Rivermead, Keynsham, near Bristol, Som.

**Wanted**.—*Entomologist's Record*, 1911-37, bound or unbound. Offered:—Various volumes of *The Entomologist*.—B. O. C. Gardiner, "The Red House," River-in-Dover, Kent.

**Wanted**.—Information re literature on West African Lepidoptera.—Surgeon Lt. H. M. Darlow, R.N., F.R.E.S., R.N.B. Kissy, H.M.S. Eland, c/o G.P.O., London.

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*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: March 20th; April 3rd; at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1: Wednesday, March 27th; April 10; 6.0 for 6.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppell Street, Gower Street, W.C.1: Sectional Meetings on first Tuesday and General Meetings on third Tuesday of each month, 6.30 p.m. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

*Communications promised*:—H. Donisthorpe, A. H. Turner, Com. G. W. Harper, R.N., Dr N. R. Birkett, the late Dr H. G. Harris, T. Bainbrigge Fletcher, Orazio Querci, Dr Malcolm Burr, Hy. J. Turner, B. J. Lempke, P. B. M. Allan, R. M. Payne, H. A. Leeds, W. Fassnidge, S. G. Castle Russell, H. W. Andrews, J. E. Collin, Dr E. A. Cockayne, Rev. G. Wheeler.

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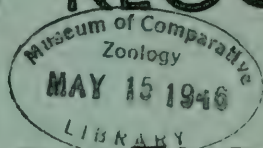
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# ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION



EDITED with the assistance of

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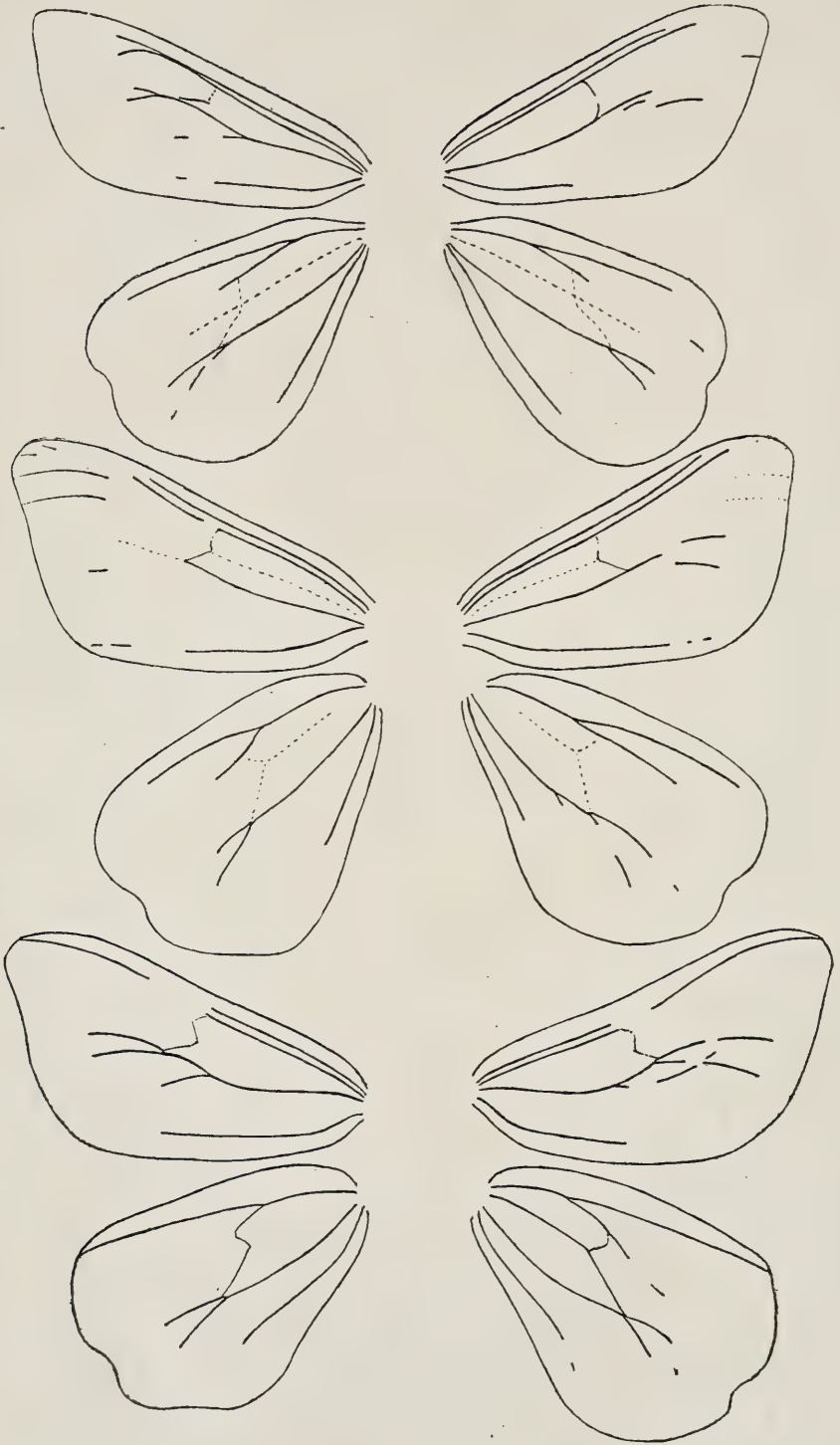
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Fig. 1. *Abraxas grossulariata*. York.

Figs, 2, 3. *Abraxas grossulariata*. S.E. London.



# PERONEURAL DEFECT IN ABRAXAS GROSSULARIATA, L.

By E. A. COCKAYNE, D.M., F.R.C.P.

Plate III.

I have three males of *Abraxas grossulariata* with an extreme peroneural defect, two from the collection of the late H. E. Willoughby Ellis labelled " S.E. London, June 1920, C. W. Sperring," and one labelled " York, Clifton, July 1912, S. Walker." There are two more, a male and a female, in the Rothschild collection, British Museum (Tring), the former labelled " Brazenor, Brighton " and the latter " Bred N. London larvae, J.D.M., 1911." All five are very similar in appearance, and in spite of their fragility they are undamaged. The marginal spots of the forewing are very small and partially fused to form a narrow black stripe or they are fused to form a narrow band showing little indication of its origin from a row of black spots. In none of them does the black stripe or band quite reach the termen. The row of black spots on each side of the orange fascia is more or less fused into a continuous band. The hindwings have an indentation near the middle of the termen, which is marked by a black spot in four; in the fifth the margin is spotless. In the S.E. London specimens there are numerous transverse and longitudinal creases due to lack of supporting nervures and the fore- and hindwings are bent downwards, which makes it impossible to obtain a satisfactory photograph. In the male from York the forewings are fully expanded, but unusually narrow, the left narrower than the right, and the right hindwing is smaller than the left. In all five the cuticular margin of the wings is present.

The fully developed nervures or parts of nervures are shown in the diagram by thick lines, and the position of others, seen as very thin lines, which disappear on transillumination, are in some cases indicated by dotted lines. Thin lines of this kind indicate the position of 5, the continuation of 3 and 4, and the terminal parts of many others. In the S.E. London specimens the praecostal nervure on both sides ends at or near the discocellular nervure in one and is much longer, though incomplete in the other, and I think the discocellular in both is incomplete. The only complete nervure is 8 in the hindwings of one specimen. The diagram shows the extent of the deficiency in all the others and the abnormal course of two. It is obvious that the wings would have broken very quickly, if the moths had been at large, and their perfect condition seems to me to prove that they were bred. The neururation of the two *grossulariata* in the Rothschild collection is much less deficient, though almost all the nervures fail to reach the margin.

In my paper on this defect in *Brenthis euphrosyne* I suggested that it is inherited, but I overlooked a paper by Reiff on *Argynnis cybele*, F., ab. *bartschi*, Reiff, which provides additional evidence pointing to the same conclusion. Reiff records that R. C. B. Bartsch caught three remarkable examples of peroneural defect in this species at West Roxbury, Massachusetts, in July 1907, two of which he considered too damaged to be worth keeping. All were taken in an isolated swampy meadow almost surrounded by woods. Their flight was quick but waver-

ing and they were easily recognized on the wing. Bartsch, stimulated by Reiff's interest, went again to the same meadow in 1910 and caught another damaged one, almost exactly like the other three. Reiff gives a figure of the upper and under surfaces of the first and a diagram of the neururation of one side. In all respects there is a close resemblance to the *Argynnis aglaia* taken near Eastbourne.

The capture of three specimens in one year and its recurrence three years later in the same isolated meadow is strong evidence that the abnormality is inherited, especially in view of the fact that these are the only specimens recorded in *cybele*. The two S.E. London *grossulariata*, almost certainly members of the same brood, add further evidence of its inheritance.

I am able to add one more species, in which the defect has occurred. There is a very perfect example in *Plebejus argus*, L., male, in the collection of Mr S. G. Castle Russell.

The nature of the defect is uncertain. During an early stage of development tracheal branches enter the wing-buds and extend as they enlarge. At a later stage the longitudinal nervures are formed around the tracheae, and during the final stages the hypodermis secretes the thickened cuticular walls of the nervures. It is at this stage that the peroneural defect becomes apparent. The tracheae grow as usual, but the hypodermal cells fail to form the cuticular tube along the whole of their length. The proximal parts are formed normally and isolated pieces of the more distal parts; the faint lines, which disappear on transillumination, are probably the tracheae themselves.

Cockayne, E. A. *Ent. Record*, 1945, **57**, 109.

Reiff, W. *Psyche*, 1910, **17**, 252. Pl. 1.

*Ent. Z.*, 1913-1914, **27**, 29.

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### LIGHT-TRAP CAPTURES IN IRELAND IN 1945 (LEP., TRICH., EPHEM., PLEC.).

By BRYAN P. BEIRNE and J. R. HARRIS.

Owing to electricity rationing it was not possible to operate light traps in Ireland during the war. In 1945, however, two traps were in use in Co. Dublin, one in the wooded valley of the Liffey at Lucan and the other on the cliffs of Howth. The authors wish to express their thanks to Mr George Shackleton, jun., and to Professor J. Bayley Butler for providing the electricity for these traps and for their assistance in operating them.

The Lucan trap was that in which some 310 species of Lepidoptera were taken at Seapoint, Co. Dublin, in the four years before the war (see Beirne, *Ent. Rec.*, **53**: 45) with one modification in that instead of three sheets of glass in the front there were only two, which were so arranged as to leave a vertical opening about two inches wide between their inner edges through which the insects could enter. Illumination was provided by a 60-watt bulb, which was lit for six days and nights a week. For reasons which will become apparent, it is necessary to



describe the location of this trap in some detail. It was situated on a cement landing-stage on the banks of the Liffey, its floor being only a few inches above the surface of the water. The presence of a weir keeps the river at more or less the same level at this point. The trap was situated on a bend of the river, facing upstream over the water. Behind it was a wall, above which was a gravel path, a large house, and a mill. Because of the position of the trap any insects attracted to it had to fly some distance over the surface of the river from either bank.

This trap was in use from the beginning of May to 20th September. The Lepidoptera taken were identified and their numbers noted, and the Trichoptera, Ephemeroptera and Plecoptera were identified, but were not counted owing to the vast numbers of certain species. Diptera were attracted in enormous quantities, and their dead bodies, and those of the Trichoptera, often formed a layer on the floor of the trap several inches deep in the corners. The Diptera were not identified.

LEPIDOPTERA (B.P.B.). A total of 197 specimens were taken, belonging to 64 species. Only 31 specimens, comprising 15 species, were taken during May, namely: *Laotoë populi* (1), *Dasychira pudibunda* (2), *Spilosoma lubricipeda* (10), *S. lutea* (3), *Cynia mendica* (1), *Calocasia coryli* (4), *Electrophaes corylata* (1), *Dysstroma truncata* (1), *Lampropteryx suffumata* (1), *Xanthorhoë ferrugata* (1), *Epirrhoë alternata* (1), *Hydriomena coerulata* (1), *Eupithecia* sp. (2), *Gonodontis bidentata* (1) and *Phlyctaenia fuscalis* (1). The only captures during June were *S. lubricipeda* (6) and *Nymphula stagnata* (1), while in July no Lepidoptera were taken. Late in July the trap was turned at right angles to face one bank of the river, but this made no difference. This slackening-off in the captures was remarkable, especially when dozens of specimens, and not infrequently over a hundred, were taken in the same trap every night at Seapoint which, being in the suburbs of Dublin, should be a much less favourable locality than Lucan.

The only likely explanation which could be suggested was that the effect of the river was to create a relatively cold belt of air over its surface. As Lepidoptera are very sensitive to temperature changes, this cold air might have prevented them from reaching the trap. In May the contrast between the temperature of the air over the river and that over the banks was less marked than later in the summer, and thus would not have had so great an effect on the Lepidoptera and allowed a few specimens to reach the trap.

In order to test this theory the trap was raised on a platform about ten feet vertically above its original position on 10th August. The results provided a strong indication that the theory may be correct. Between that date and 10th September 166 specimens, belonging to 51 species, were taken. They were as follows: *Cilix glaucata* (2), *Cryphia perla* (2), *Amathes xanthographa* (1), *Diarsia rubi* (1), *Triphaena pronuba* (2), *T. ianthina* (1), *Tholera popularis* (15), *T. cespitis* (1), *Luperina testacea* (2), *Phlogophora meticulosa* (5), *Phalaena typica* (4), *Apamea monoglypha* (2), *A. secalis* (2), *Hydraecia oculea* (5), *H. micacea* (6), *Gortyna flavago* (8), *Arenostola pygmina* (12), *Leucania pallens* (2), *L. lithargyria* (1), *Amphipyra tragopogonis* (4), *Agrochola lota* (1),

*Cirrhia icteritia* (1), *Plusia chrysitis* (1), *P. festucae* (1), *P. gamma* (3), *Pyrena proboscidalis* (1), *Sterrhia dimidiata* (1), *Ortholitha chenopodiata* (6), *Dysstroma truncata* (12), *Lyncometra ocellata* (2), *Thera obeliscata* (1), *Xanthorhoë designata* (1), *X. fluctuata* (1), *Epirrhoë alternata* (6), *Gymnoscelis pumilata* (1), *Orthonama lignata* (1), *Ennomos quercinaria* (1), *Deuteronomos alniaria* (1), *Alcis rhomboidaria* (1), *Cleorodes lichenaria* (1), *Crambus tristellus* (27), *Nymphula stagnata* (3), *N. stratiotata* (2), *Hydrocampa nympheata* (1), *Notarcha ruralis* (1), *Phlyctaenia lutealis* (3), *Scopula* sp. (3), *Platyptilia gonodactyla* (1), *Peronea variegana* (1), *Agonopteryx costosa* (1), and *Hoffmannophila pseudospretella* (1).

The fact that a stretch of water may form an effective barrier to the dispersal of Lepidoptera because of the air temperature over its surface is of considerable importance. For example, it would indicate that the sea separating the British Isles from the Continent may form a far more effective barrier because of this than because of the distances involved. It will have been noted that the majority of the Lepidoptera taken in the trap were large and powerfully-flying species, while there were relatively few Geometers and even fewer Microlepidoptera. This would indicate that for the more feebly-flying species even a river is a formidable barrier to dispersal.

EPHEMEROPTERA (J.R.H.). Five species of Mayflies were taken in the trap, mostly subimagines. It is probable that all but the *Ephemerella* spp. entered accidentally during daylight. No species was common, *Ephemerella ignita* and *E. notata* were frequent, *Baetis rhodani* and *B. pumilis* occasional and *Ephemerella danica* rare.

TRICHOPTERA (J.R.H.). Twelve species of Caddis flies occurred, some of them in vast numbers. Their numbers increased considerably when the trap was raised. As these insects usually fly over the surface of the water the same explanation which was applied to the Lepidoptera is unlikely to apply to them, and the reason for their increased numbers is not clear. With most species the females were much more numerous than the males; this may have been due primarily to the location of the trap, which faced over a section of the river where the males do not hover in any numbers, but where the females oviposit. *Tinodes waeneri* occurred in enormous numbers throughout the summer and *Hydropsyche ornatula* also was extremely abundant. *Sericostoma personatum* was not frequent although it is common along the river, and the same applies to *Mystacides azurea*. *Leptocerus cinereus* was frequent, *Silo pallipes*, *Rhyacophila munda*, *R. dorsalis* and *Limnophilus rhombicus* were occasional, and *Phryganea striata*, *Leptocerus albifrons* and *Agapetes fuscipes* were uncommon.

PLECOPTERA (J.R.H.). A single species of Stonefly was taken, *Iso-perla grammatica*, which was frequent in May and June. Most specimens appeared to have entered the trap as nymphs, the adults apparently always hatching on the floor. In order to enter the trap the nymphs had to travel several feet. Several nymphs died without producing adults, presumably being killed by the heat inside the trap due to the electric bulb and the sun.



The Howth trap was of a different design, and consisted of a truncated glass pyramid with a 6-inch square opening at the top through which the insects could enter. Over the trap, and about two inches from the edges of the opening, was a flat roof, painted white below. The glass rested on a platform in the centre of which was a wooden container about a foot square. Illumination was provided by a 60-watt electric light bulb suspended within the glass pyramid. The trap was situated on the edge of the cliffs, partly projecting over the edge, on the eastern side of the promontory known as the Lion's Head. This is the well-known locality for the rare Howth Lepidoptera. The trap was in operation at irregular intervals, on an average of about two nights a week, from the middle of June to the beginning of September. It was not possible to visit it regularly and thus some method of killing the insects had to be used (they remained alive in the Lucan trap). Cyanide of potassium was tried at first, but the container was too large to permit the gas to reach an effective concentration. Later the insides of the trap were covered with "666" (benzene hexachloride) and this was more effective, but owing to its slow and irritant action many moths damaged themselves considerably before dying. No count of the captures was made.

The only insects identified were the Lepidoptera, and the following is a list of the 48 species which were sufficiently undamaged to be identifiable (B.P.B.): *Laotoë populi*, *Phalera bucephala*, *Arctia caja*, *Spilosoma lubricipeda*, *S. lutea*, *Callimorpha jacobaeae*, *Agrotis segetum*, *A. exclamationis*, *Lycophotia varia*, *Amathes xanthographa*, *Triphaena comes*, *T. pronuba*, *Ceramica pisi*, *Hadena andalusica* (*barrrettii*), *H. lepida* (*capsophila*) (the commonest species in the trap), *Thalophila matura*, *Luperina testacea*, *Apamea monoglypha*, *Aporophyla nigra*, *Procus strigilis*, *P. literosa*, *Leucania impura*, *L. lithargyria*, *L. conigera*, *Caradrina clavipalpis*, *Cosmia trapezina*, *Plusia chrysitis*, *P. gamma*, *Scopula marginepunctata*, *Ortholitha scotica*, *O. chenopodiata*, *Anaitis plagiata*, *Lyncometra ocellata*, *Xanthorhoë ferrugata*, *X. fluctuata*, *Epirrhoë alternata*, *E. galiata*, *Gymnoscelis pumilata*, *Ellopiia fasciaria*, *Selenia bilunaria*, *Crocallis elinguaris*, *Gnophos obscurata*, *Pempelia dilutella*, *Crambus pascuellus*, *C. tristellus*, *Phlyctaenia lutealis*, *Polychrosis dubitana* (*littoralis*) and *Eupista* sp.

The relative scarcity of Microlepidoptera may have been due to the design of the trap, which prevented them from entering readily. Having experimented with traps of various designs and sizes during the past twelve years, I have come to the conclusion that the chief requisites for maximum efficiency are: ease of entry for the insects, and large size. If the insects can get in easily they also can get out easily, but if they have plenty of room to fly around the light a very large proportion of them will be retained.

[With reference to Dr Beirne's paper on light-trap captures at Lucan, Co. Dublin, he sent me some of the flies bred from "a mass of dead and decomposing insects (chiefly Diptera and Trichoptera) on the floor of the trap." These proved to be 1 ♂ of *Muscina assimilis*, Fall. and 2 ♂♂ and 2 ♀♀ of *M. pabulorum*, Fall., both common and widely distributed species. According to the text-books the larvae of this genus may be saprophagous, zoophagous, or omnivorous.—H. W. ANDREWS.]

**A NORTH SOMERSET MEDLEY: LEPIDOPTERA IN 1945.**

By J. F. BIRD, F.R.E.S.

ADDITIONS TO THE SOMERSET LIST.—Through an erroneous identification by the captor, *Arenostola fluxa* (*hellmanni*) was recorded by the late A. E. Hudd, in his "Appendix (1912)" to the County List in the *Victoria County History of Somerset*, as having been taken in 1910. This error was pointed out by the late A. R. Hayward, who stated that "the seven specimens taken . . . were subsequently found to be *fulva*, Hb." (*Proc. Som. Arch. and Nat. Hist. Soc.*, lxxxv, 210). I am, therefore, pleased to be able to reinstate this species, as a female specimen was captured at light in my garden on 12th July by my son, H. W. Bird. He was, later, fortunate enough in securing a fresh example of *Alispa angustella*, also at light, in the house on 28th August; another record for the County. With reference to the latter, Hudd remarked, in his "Appendix (1913)," that the species "is recorded by Stainton in 'the Manual' from 'near Bristol'," but that he knew of no captures in Somerset. I subsequently searched the berries of *Euonymus europaeus*, during the autumn, hoping to find the presence of the larvae, but without success. Evidently this little Pyrale must be rare, or else very local, in this neighbourhood.

PAPILIONES.—Unlike more favoured districts further south, where some remarkable captures have been recorded, the Clevedon area proved—so at least I found it—a poor place for butterflies during 1945; nevertheless, both generations of *Celastrina argiolus* were plentiful, and *Argynnis paphia* far from scarce in its woodland haunts; but they were exceptions. Otherwise, many of the commoner species were not in their usual numbers, for instance, *Heodes* (*Lycaena*) *phlaeas*, *Aricia agestis*, *Polyommatus icarus*, *Erynnis tages*, etc.; and some not observed at all, such as, *Argynnis cydippe*, *A. aglaia*, and the fresh generation of *Gonepteryx rhamni*, although the hibernated specimens of the last-named were in fair numbers, several males having been seen on the wing as early as 20th February. Consequently, I took nothing really worth mentioning excepting a fine female *Pyrgus malvae*, ab. *intermedia*, very closely approaching ab. *taras*; and another female, of the same species, with a whitish-grey streak running from the base of the forewings, and a conspicuous curved band of dashes across the middle of the hindwings. *Vanessa cardui* was not common, but we were interested to discover a few of the larvae on burdock (*Arctium lappa*), growing in a wood. The larvae were only found on the smaller plants, on the upper-side of the leaves, mid-way up the plant, where they lived singly in a web spun at the tip.

OVIPOSITION OF *CUCULLIA VERBASCI*.—The larvae of *Cucullia verbasci* are most destructive to the cultivated mulleins in the garden; and in 1944, being curious to learn how, and where, the moth laid her eggs, I carefully searched the plants, from day to day during May, to see if I could solve the problem. Strangely enough, during that year our garden was entirely free from the pest, the first time since we came here in 1938. Nor did I see any of the larvae on the *Verbascum* growing wild in the surrounding countryside, but only in the adjoining county of Gloucestershire, where I noticed it feeding on cultivated mullein in



a friend's garden in Gloucester. In 1945, however, I was more successful, for I found a number of the ova on the plants in our own garden, laid early in May. It appears that the eggs are deposited singly, one to three or four, on the under-surface of the leaves, usually by the side of a prominent vein, and not, as a rule, on any of the uppermost or lower leaves, but on those half-way up the plant. I was rather surprised to find the ova deposited in this solitary fashion, for I had imagined, judging from the almost gregarious habits of the larvae, that they would have been laid in a cluster. The young larvae began to hatch out on 16th May.

**MELANISM.**—A feature of the year was the number of melanic specimens observed. The species most affected was *Cleora repandata*, the var. *nigricata* being more plentiful than the type, not only in Clevedon, but in the surrounding woods. One, taken at light by my youngest son, exhibits a small grey area on the hindwings, just beyond the anal angle, which gives to the insect, otherwise very black, a most pleasing effect. Other melanic specimens taken during the year were: *Apatele rumicis*, ab. *salicis*, at light on 21st July; apparently an unusual capture for Somerset, as I see South remarks that it "occurs northwards from Shropshire through northern England into Scotland." *Craniophora ligustri*, ab. *nigra*, at light, on 13th July. *Agrotis clavis* (*corticea*), several much suffused examples. *Procus strigilis*, ab. *aethiops*, *Luperina testacea*, a blackish male. *Apamea crenata*, ab. *alopecurus*. *Meganephria oxyacanthae*, ab. *capucina*. *Thera obeliscata*, ♀, ab. *obscura*, so dark that the bar is almost indiscernible. *Oporinia dilutata*, a few approaching ab. *obscurata*. *Hydriomena furcata*, ab. *obscura*. *Eupithecia abbreviata*, entirely black. *Biston betularia*, an intermediate form, taken at light; but a friend in Clevedon tells me that he saw, but failed to box, an entirely black ♂, found in cop. with a typical ♀. *Ectropis bistortata*, a number of the black forms, including one ♂ of the third, September-October, generation, at light.

**ATTRACTION BY ELECTRIC LIGHT.**—Some of the following hints may, possibly, be found useful to collectors utilising interior lighting as a means of attracting moths: (1) It is as well to remove globes and shades covering electric bulbs. (2) Windows being used should be open top and bottom; and others, which may be in the same room, curtained off to prevent moths from congregating on the outside where they would be awkward to secure. (3) During breezy weather try the leeward side of the house, which will often be found productive when no moths are being attracted on the windward side. (4) On still nights, when lights on opposite sides of the house are being used, it will be frequently noticed that certain species are, for some reason, coming in on the one side, but not on the other. (5) By using a long flex, passed through a window, it is possible to rig up one, or two, electric bulbs on a short stand to be placed on a white sheet spread on the lawn, or some other convenient spot in the garden. This arrangement will often attract more moths than the illuminated window. (6) A 500 watt bulb, placed near, but not too close, to the open window will sometimes have surprising results and attract more moths than can be conveniently dealt with. We, therefore, only use this attraction for short spells on suitable occasions.

From the memorable night of 8th May, when all light restrictions were lifted, to the end of "Victory Year," we recorded at light, in our house or garden, 242 species of Lepidoptera, divided up as follows: Sphingidae, 1; Notodontidae, 6; Thyatiridae, 1; Lymantriidae, 3; Lasiocampidae, 4; Drepanidae, 1; Nolidae, 2; Hylophilidae, 1; Arctiidae, 11; Caradrinidae, 80; Plusiidae, 15; Geometridae, 85; Pyralidae, 23; Crambidae, 4; Pterophoridae, 2; Orneodidae, 1; Cossidae, 1; Hepialidae, 1; besides numerous Tortrices, etc., which we disregarded. We are, therefore, not dissatisfied with the results attained during the last eight months of 1945; and, perhaps, the special mention of some of our captures, with a few supplementary comments, may be found of interest.

*Laotoë populi*, 1st gen., 21.vi-13.vii; 2nd gen., 29.viii, a rather small and light-coloured ♀. *Pheosia tremula*, 11.viii, one ♀. *P. gnoma*, 18.vii-27.viii, scarce, both sexes. *Notodonta dromedarius*, 25.vii, one ♀. *Lophopteryx capucina*, 1st gen., 17.v; 2nd gen., 19.vii-20.viii. *Pterostoma palpina*, 2nd gen., 30.vii-13.viii. *Habrosyne deraea*, 5.vii. *Lymantria monacha*, 30.vii. *Poecilocampa populi*, 30.xi-14.xii. *Lasiocampa quercus*, 11.viii, one ♀. *Cilix glaucata*, 1st gen., 10.v; 2nd gen., 16.vii-7.ix. *Celama confusalis*, 8.v-18.v. *Sarothrips revayana*, 11.x. *Phragmatobia fuliginosa*, 24.vii. *Arctia villica*, 19.v, a minor variety in which the spots at the apex coalesce, as do the two at the anal angle. *Mitochrista miniata*, 7.vii-28.vii, the males common, and in lovely condition, but only two ♀'s. *Eilema griseola*, 11.vii-31.vii, common. *E. complana*, 12.vii, one ♂. *E. sororcula*, 11.v, one ♂. *Colocasia coryli*, 31.vii. *Apatele rumicis*, 18.vii-27.viii. *Craniophora ligustri*, 13.vii. *Agrotis clavis*, 11.vi-14.vii, abundant, and very variable. *A. puta* (*radius*), 14.vii-12.x. *A. ipsilon*, 20.vi-1.xi. *Euxoa nigricans*, 8.viii. *E. tritici*, 27.vii. *E. aquilina*, 25.vii-27.vii. *Amathes triangulum*, 11.vi-28.vii, common. *Triphaena interjecta*, 15.vii. *Hadena conspersa*, 4.vii. *H. lepida*, 18.v-22.v. *Eumichtis lichenea*, 12.ix-19.ix. *Dryobotodes protea*, 12.ix. *Thalophila matura*, 14.vii-22.vii, common, and in fine condition, unlike the worn specimens usually seen at treacle. *Aporophyla nigra*, 12 and 13.x. *Dasypolia templi*, 4.x, one ♂. *Antitype flavicincta*, 16.ix. *Nonagria typhae*, 14.viii. *N. geminipuncta*, 13.viii, one ♀. *Chilodes maritima*, 13.vii, one ♂. *Arenostola fluxa*, 13.vii, one ♀. *Rhizedra lutosa*, 1.x-8.x, ♂ and ♀. *Leucania straminea*, 9.vii, one ♂. *Petilampa minima*, 4.vii-12.vii. *Tiliacea citrargo*, 15.ix-4.x. *T. aurago*, 4.x. *Lithophane socia*, 21.xi. *Xylina vetusta*, 11.x. *Pyrrhia umbra*, 20.vii. *Rivula sericealis*, 15.vii. *Phytometra viridaria*, 2nd gen., 12.vii. *Polychrysis moneta*, 30.vii. *Plusia pulchrina*, 15.vii. *Catocala nupta*, 31.viii-1.x. *Lygephila pastinum*, 4.vii. *Laspeyria flexula*, 4.vii. *Hypena proboscidalis*, 1st gen., 18.vi-31.vii; 2nd gen., 7.ix. *Schrankia costae strigalis*, 11.x. *Pseudoterpna pruinata*, 9.vii-1.viii. *Hemistola chrysoprasaria*, 4.vii. *Scopula immutata*, 4.vii. *Colothysanis amata*, 1st gen., 20.vi; 2nd gen. 13.x. *Acasis viretata*, 20.vii-17.viii. *Electrophaes corylata*, 8.v. *Chloroclysta miata*, 23.ix-11.x. *Colostygia pectinataria*, 2nd gen., 3.ix-16.ix. *Larentia clavaria*, 16.ix-16.x. *Discoloxia blomeri*, 19.vii. *Euchoeca nebulata*, 18.v. *Operophtera fagata*, 23.xi-6.xii. *Pelurga comitata*, 18.vii-25.vii. *Epirrhoë rivata*, 4.ix. *Perizoma alchemillata*, 15.vii. *P. albulata*, 1st gen., 11.v; 2nd gen., 25.vii. *Nyctosia obstipata*, 19 and 21.ix, two ♀'s. *Horisme vitalbata*, 1st gen., 18.v; 2nd gen., 18.vii. *H. tersata*, 9.vii-14.vii. *Eupithecia pulchellata*,



14.vi-12.vii. *E. linariata*, 21.vii-30.vii. *E. venosata*, 8.v. *E. tripunctaria*, 28.vii-9.ix. *E. icterata*, 2.viii-30.viii. *E. haworthiata*, 2.vii-13.vii. *E. valerianata*, 12.v. *E. fraxinata*, 18.v, the only previous record appears to be "one taken at Bathampton" (*Victoria County History*). *E. dodoneata*, 8.v. *E. sobrinata*, 24.vii. *Chloroclystis coronata*, 1st gen., 8.v-13.vii, several "V-Pugs" turned up, most appropriately, on "V-Day!", 2nd gen., 20.viii. *Bapta bimaculata*, 12.v. *Erannis auran-tiaria*, 25.xi-6.xii. *E. defoliaria*, 24.xi-22.xii, some splendid varieties of this common moth. *Plagodes dolabraria*, 18 and 21.v. *Deuteronomos alniaria*, 27.viii-29.viii. *Crocallis elinguaris*, 13.vii-18.viii, including one ♂ with mottled forewings. *Ourapteryx sambucaria*, 1st gen., 19.vi-1.viii, including ab. *cuspidata*, with the outer margin of the forewings angulated; 2nd gen., 21.x. *Cleora repandata*, 19.vi-24.vii, including var. *nigricata*, common, and one var. *conversaria*. *Ectropis bistortata*, 2nd gen., 4.vii-25.vii, several, including melanic forms; 3rd gen. 28.ix, a black ♂. *Acentropus nivea*, 13 and 14.vii, several. *Cataclysta lem-nata*, 14.vii-7.ix, mostly ♀'s. *Rhodaria purpuralis*, 25.vi-12.viii. *R. ostrinalis*, 14.vii. *R. aurata*, 18.vii. *Hapalia ferrugalis*, 21.x. *Psam-motis crocealis*, 4.vii. *Perinephila lancealis*, 24.vi. *Mecyna asinalis*, 13.vii-5.x. *Pyrallis costalis*, 13.vii-2.x. *Alispa angustella*, 28.viii. *Dio-ryctria fusca*, 13 and 14.vii. *Homoeosoma sinuella*, 19.vi. *Myelois cribrella*, 24.vii. *Euzophora advenella*, 12.viii. *E. consociella*, 17.vii-14.viii, common. *Crambus perlellus*, 6.vii-16.vii, including one ♂ streaked with bronze. *C. geniculeus*, 30.vii. *Chilo phragmitellus*, 7.vii. *Zeuzera pyrina*, 13.vii, one ♂.

(To be concluded.)

## COLLECTING NOTES.

PONTIA DAPLIDICE, L., IN SHOREHAM, SUSSEX.—It may interest your readers to know that I saw a specimen of the "Bath White" settled on a knapweed flower-head on 18th July last. I was near enough to identify it with certainty by its distinctive underside. On the Downs a week later a male specimen of *Colias hyale* was seen but also eluded capture. On 11th October, however, I was more successful and succeeded in netting an example of this immigrant. Its congener, *C. croceus*, occurred in small numbers during August, September, and first half of October, but I did not see any of the var. ♀ *helice*.—L. H. BONAPARTE WYSE, Adur House, Shoreham-by-Sea.

NOCTUAE CAPTURES AT YEW.—It appears from some of the notes which have appeared in the *Record* on this subject that there is a disposition in some quarters to doubt that the attraction to Yew is the berries at all. This is a complete error.

I have worked Yew regularly for the last 23 years from mid September to late October, and only those trees with berries are attractive (with one exception).

Many Yews near Arundel are growing within shade of other trees and without fruit. They are useless, but trees in the open with fruit are very attractive indeed, from the time the fruit is ripe enough to

exude a glutinous juice from the base of the berries. By no means are all yews attractive at the same date, but once they become so they remain so till the fruit falls in late October, when all appear to be attractive together.

I know of only one Yew which, like the hedge mentioned by Messrs Danny and Savage, is attractive by reason of some sort of honey dew. This tree is stunted, fruitless and attractive all the season that moths are about and weather dry.

There are, of course, many natural attractions to Noctuae and Geometrae as well. Many flowers, Sallow blooms, both male and female when ripe, honey dew, blackberries, ivy bloom, Yew berries, Laurel flowers, Elder berries. These last especially when the juices have fallen and they are shrivelled.

Two which appear to be peculiar are the large deadly poisonous *Atropa belladonna* berries, to which *P. meticulosa* come freely in Arundel Park and neighbourhood.

I once collected a number of these and kept them alive for a week to see if they were poisoned, but no, they suffered no obvious trouble. As at Yew, the lure was a juice exuding from base of ripe berries, but while Yew berries are poisonous to humans, it is the "stone" that is bad, the pulp is harmless: this is not so with belladonna: the pulp is deadly.

I used when sugaring to break small branches and leave them hanging in outskirts of woods to act as markers for direction finding and discovered that hawthorn branches when dead or dying are attractive to some moths in damp weather, such as slight mist. Among species I have so taken are *L. semibrunnea* and *S. satellitia*.—A. J. WIGHTMAN, Pulborough.

"CANNIBALS."—I see that in a recent publication on "Moths" it is stated that the larvae of *C. trapezina* are so cannibalistic that they eat one another, and that only one in a hundred can be expected to reach the imago state if kept together.

I have for years collected the larvae of this species for variety breeding and I find that they rarely attack each other, unless the victim is injured by the beating stick.

I bring them home, ten in each 2 in. glass bottom box, and rarely fail to find all ten in putting them into breeding cage.

I keep about 100 larvae in each cage, 18 in. square, and get 82 per cent. moths in one year, rarely less than 60 per cent.

This larva attacks many species of Noctua larvae, like *C. affinis*, *pyralina* and *diffinis*, and a good number of Geometer larvae, but there are scores of species it will not touch, *M. pulverulenta* for one.

I have also reared *S. satellitia* from ova to imagines in a single cage and never saw them attack each other.

Is not the question of lack of moisture at the base of most cannibalism? *Trapezina* fed on juicy lime leaves seems to lose all cannibalistic tendencies, and the larva of *T. ulvae* (*maritima*) is a cannibal if kept short of water.

*Oo* is said to be a cannibal, but when I reared some, years ago, I could not raise their appetites without directing and even by opening up their feeding tents and inserting tempting looking oak feeding Geos.

The most aggressive larva I know is that of *Leucania litoralis* (*litoralis*). These larvae bite one another with such savage fashion I can







UNUSUAL VARIETY OF *ARCTIA CAJA*, LINN.



only rear them by keeping each larva separate.—A. J. WIGHTMAN, Pulborough.

*TETTIGONIA VIRIDISSIMA*, L., AT CHRISTCHURCH, HANTS.—During a visit to Christchurch last August I happened to hear loud chirpings from a clump of stinging-nettles and privet. After making a careful search I succeeded in capturing two male specimens of *Tettigonia viridissima*, Linnaeus, one of which I took home for observation, keeping it temporarily in a jam jar and providing it with lettuce—a food which it ate greedily. Soon after dark it began to stridulate loudly, which necessitated its removal from the house. Each evening until about midnight it continued to make itself a nuisance by keeping people awake, so it was removed to the bottom of the garden, about 40 yards distant, where its vocal efforts were not loud enough to cause annoyance. Here it lived from 17th August to 15th October in an insectarium where it was provided with various green foods. Of these, however, it devoured little although it continued to stridulate every night but with less frequency as time passed on. A curious feature was that a member of the family, aged over 70 years, whose hearing is nevertheless good, was unable to hear the slightest sound from the insect even when it was stridulating violently, although listening at a distance of no more than six inches.—H. G. STOKES, 12 Roman Road, Salisbury.

CAPTURE OF *UTETHEISA PULCHELLA* TAKEN NEAR BISHOP'S STORTFORD.—On 18th January 1946 a specimen of this species was exhibited at a meeting of the Bishop's Stortford Nat. Hist. Society. It had been captured in the North Meadow of Hockerill College by F. R. Browning while sweeping for Coleoptera during the course of some systematic sweeping studies connected with the field ecology of beetles during 1945. The suggestion that this record should be published came from Mr R. L. E. Ford.—F. R. BROWNING.

AN UNUSUAL VARIETY OF *ARCTIA CAJA*, LINN. (PLATE IV).—The interesting features concerning this variety are:—(1) It was reared from a casually found wild larva. (2) It was forgotten until the moth emerged. (3) Most of the absent chocolate markings on the forewings are replaced by a delicate pink shading.

In June 1933 Mr J. W. Saunt found the apparently full-grown larva on the canal bank at Coventry. The nearest likely food plant was the Great Water Dock. Thinking that it would be a good example for a schoolboy to watch and subsequently to practice pinning and setting, he took the larva home and put it in a jam jar with a leaf of lettuce, left it in a cycle shed and forgot it until it was found emerged from the pupa case on 3rd July. He kindly let me have the insect after it was set.

The moth is a female. Forewings light buff, with delicate rose pink replacing chocolate markings where these are absent. This is just discernible in the photograph. The blue-black spots on the hind-wings are replaced by ill-defined yellow on the rose red ground colour, which is very similar in shade to that of var. *petriburgensis*.

The parents are, of course, unknown. Is it that in some way during confinement as a pupa, the supply of oxygen and moisture was so restricted as to inhibit the full action of the enzyme tyrosinase on tyrosine in the formation of dihydroxyindole in the yellow-orange-red series to-

wards the formation of melanin? Yet in no other variety of *A. caja* have I seen this pink colour replacing any of the chocolate markings. It would be interesting to hear the experience and opinions of others on these points.—E. BARTON WHITE, F.R.E.S.

**GREEN PUPAE.**—Reading through back numbers of the *Entomologist's Record* the other evening, I came across an article under the above title by An Old Moth Hunter (1942, 54: 113).

If the Old Moth Hunter ever came to India, he would, I am afraid, be profoundly shocked. Butterflies are, of course, shameless—green pupae in every family and no attempt at concealment, but what would he think of Lymantriids that flaunted their immodest green pupae in the flimsiest of webs? *Leucoma submarginata*, Wlk., does, it is true, conceal its spiracles with black spots, but an unidentified *Leucoma*, that I have bred from Tea at various places in the Darjeeling Hills, leaves them unconcealed and unashamed.

Running through the species I have bred in India, I find two families among the Bombyces with green pupae. Among the Lymantriidae there are the two *Leucoma* mentioned above and *Perina nuda*, F., which has a green pupa marked with chestnut on the dorsum and formed in a slight web. Moore (*Lep. Ceyl.*, ii, 98) states that the male pupa of *Dasychira thwaitesii*, Moore, is green, whilst that of the female is red, if this is correct it differs markedly from other members of the genus, including the closely allied *grotei*, Moore. One Sphingid, *Panacra metallica*, Btlr., has a bright green pupa with the anterior edges of the abdominal somites thickly streaked with buff. As is usual in its tribe, the Nephelini, it is formed in a slight cocoon on the surface of the soil.

Amongst the Noctuids I have met with no species with a pure green pupa. Pupae of the genus *Phytometra* appear to range from an olive-black to green with brown intersegmental markings dorsally, there may be a pure green species but I have not met with it. *Clethrophora virida*, Heyl., has a green pupa with a broad, purple-brown stripe down the dorsum, and it is concealed in a cocoon of thick, white, papery silk. It is difficult to understand the advantage of being green, instead of the usual brown of the family, to a pupa enclosed in a cocoon.

The Geometridae include a number of species with green pupae, I have Indian examples of three sub-families. Of the Hemitheinae, I have *Thalassodes quadraria*, Guen., *Iodis argutaria*, Wlk., and several unidentified species. These all have leaf-green pupae, concealed between two spun together leaves. Of the Sterrhinae, I have *Anisodes obrinaria*, Guen., and *Ptochophyle (Acidalia) togata*, F., both have bright green pupae marked with brown, the former suspended by a girdle and tail pad like a butterfly pupa, the latter under a slight web. Amongst the Larentiinae, three of the four Indian *Cidaria* I have bred, *obfuscata*, Warr., *aurigena*, Btlr., and *silaceata*, Schiff., have green pupae concealed in a spun together leaf.

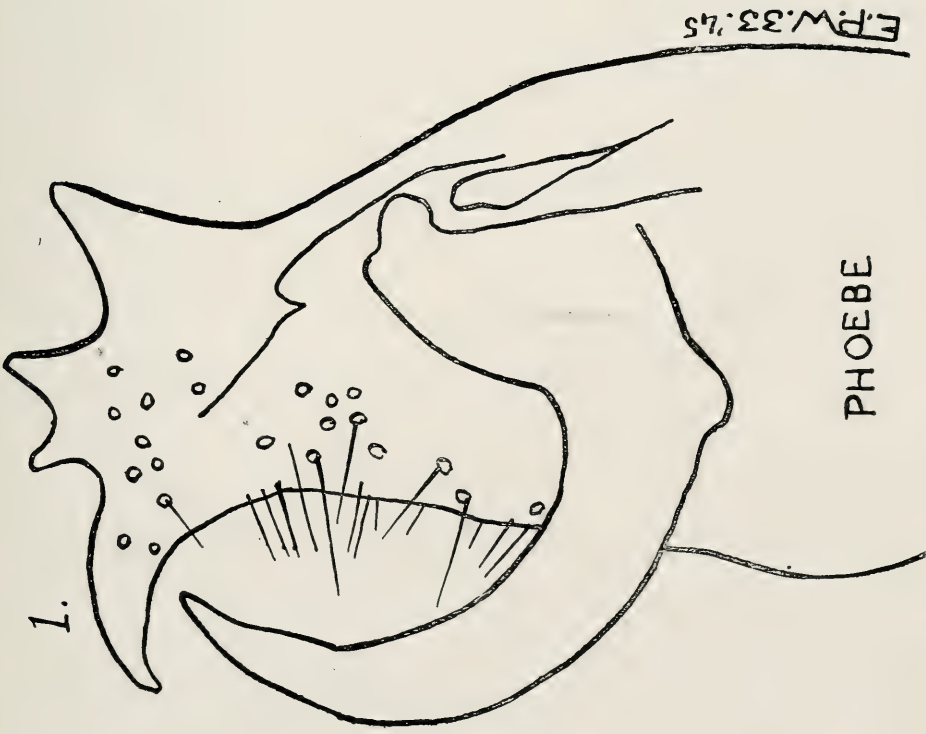
Writing from memory, I would have stated that the Pyralidae had the largest number of species with green pupae. Looking through my records I can only find one species, *Lepyrodes neptis*, Cr., with a true green pupa, *Pyrausta incoloralis*, Guen., it is true, also has a green pupa but it is so pale as to be almost white.—D. G. SEVASTOPULO, F.R.E.S., Calcutta, 30.i.46.





SARVISTANA

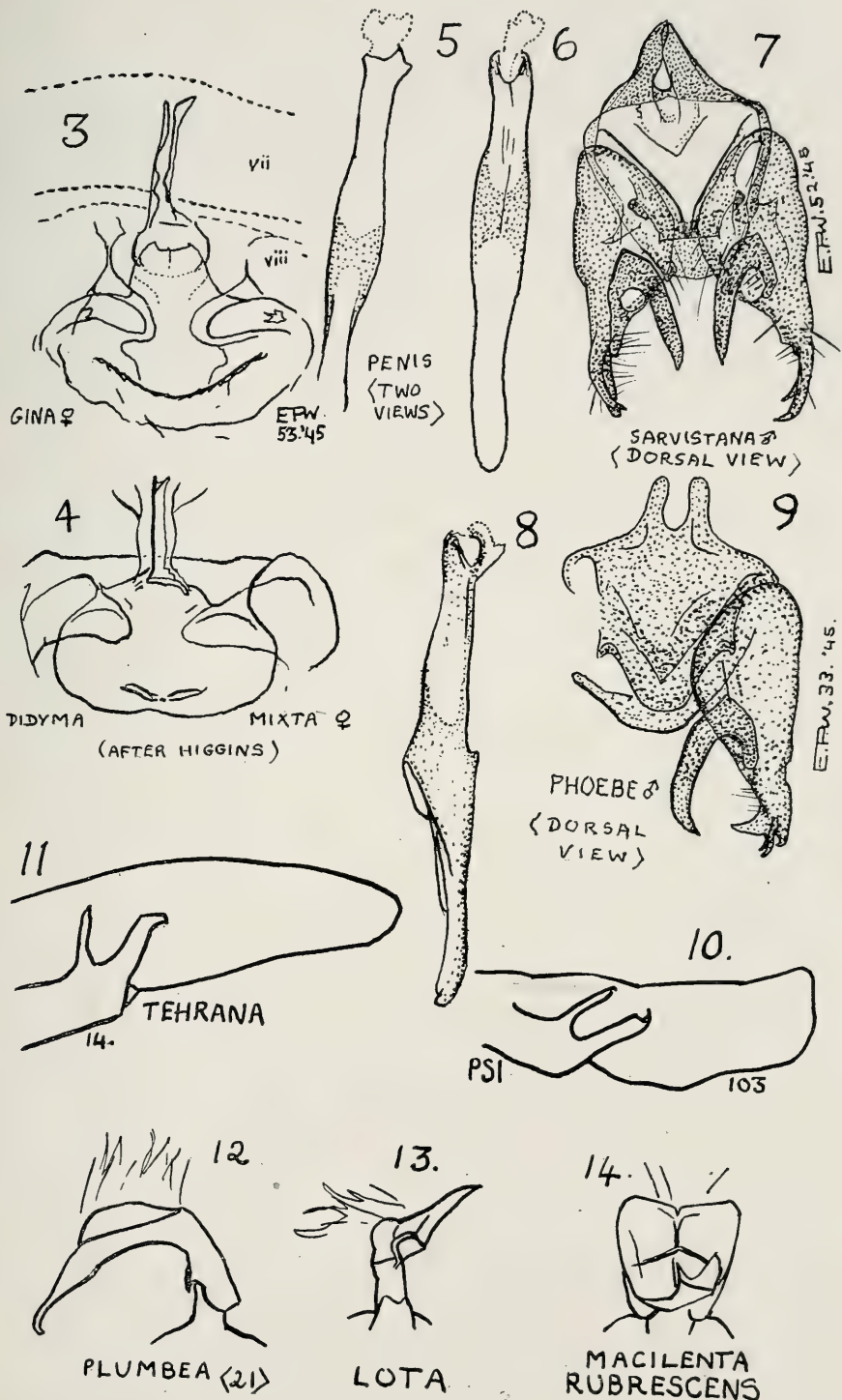
E. P. W., del.



PHOEBE







E. P. W., del.











KEY TO PLATES I, II, AND III.

PLATE I.

Interior lateral view of harpe and posterior processes of left valvae ( $\times 65$ ) of:—

Fig. 1. *Melitaea phoebe*, W.V. (Shiraz, S.W. Iran, 11.v.41, 7000 ft.).

Fig. 2. *Melitaea sarvistana*, Wilts. (Sarvistan, S.W. Iran, 26.iv.40, c. 6000 ft.).

PLATE II.

All figures are ( $\times 20$ ).

Female genitalia (dorsal view) of:—

Fig. 3. *Melitaea gina*, Higg. (Sineh Sefid, S.W. Iran, 19.v.40, c. 7000 ft.).

Fig. 4. *Melitaea didyma*, Esp., ssp. *mixta*, Evans. (after Higgins. Chitral.)

Male genitalia (dorsal view) of:—

Figs. 5, 6, 7. *Melitaea sarvistana*, Wilts. (same as fig. 2).

Figs. 8, 9. *Melitaea phoebe*, W.V. (same as fig. 1) (left valva detached).

Male genitalia (ventral view) of end of right valva of:—

Fig. 10. *Acronycta psi*, L. (Europe).

Fig. 11. *Acronycta tehrana*, Wilts. (Tehran, N. Iran, hatched 8.v.40).

Male genitalia (ventral view) of uncus of:—

Fig. 12. *Anchoscelis plumbea*, Wilts. (Type. Shapur, S.W. Iran, 20.xi.40, 3000 ft.)

Fig. 13. *Anchoscelis lota*, L. (Europe).

Fig. 14. *Anchoscelis macilentia*, subsp. *rubescens*, Wilts. (Type. Luize, Lebanon, 16.xii.34, c. 1000 ft.).

PLATE III.

Figs. a-h illustrate "Middle East Lepidoptera, New Forms and Species—IV" and Figs. j-o Early stages of "Oriental Palaearctic Lepidoptera—VIII." The scale is not uniform.

Fig. a. *Melitaea consulis*, Wilts., ab. *proconsulis*, Wilts. ( $\text{♀}$ ).

Fig. b. *Melitaea consulis*, Wilts. (normal  $\text{♂}$ ).

Fig. c. *Melitaea consulis*, W.V. (normal  $\text{♂}$ ).

Fig. d. *Melitaea phoebe*, W.V., ab. *fasciata*, Wilts. ( $\text{♂}$ ).

All four butterflies are from mountains around Shiraz, S.W. Iran.

Fig. e. *Dyspessa bipunctata*, Stgr., ssp. *brandti*, Wilts. ( $\text{♂}$ ) (Type, Ardekan, S.W. Iran, 29.vi.41, 7000 ft.).

Fig. f. *Dyspessa bipunctata*, Stgr., ssp. *marginepunctata*, Wilts. ( $\text{♂}$ ) (Pireh-Zan, S.W. Iran, 11.vi.40, c. 7000 ft.).

Fig. g. *Trichiura sapor*, Wilts. ( $\text{♀}$ ) (Type, Shapur, S.W. Iran, 11.xi.41, 3000 ft.).

Fig. h. *Tamsola tarda*, Wilts. (Type, Rowanduz, N.E. Iraq, 2000 ft.).

Fig. j. *Procris brandti*, Alberti, larva (Fars, S.W. Iran).

Figs. k, l. *Trichiura sapor*, Wilts., larvae (Shapur, Fars, S.W. Iran, 3000 ft.).

Fig. m. *Melitaea trivialis*, Schiff., pupae (To-Chal, Elburz, N. Iran, 9000 ft.).

Fig. n. *Acronycta tehrana*, Wilts., larva (Type, Tehran, N. Iran, 5000 ft.).

Fig. o. *Chondrostega aurivillii*, Pungl., subsp. *feisali*, Wilts., larva (Iraq).





## EXCHANGES.

- Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.
- Wanted**—American Hesperiidæ, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.
- Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.
- Wanted**.—*Lycaena* (*Heodes*) *phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. *Duplicates*.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.
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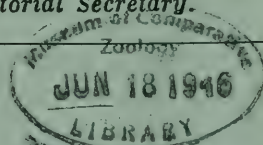
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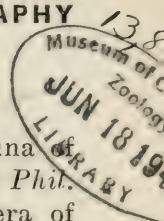
# THE LEPIDOPTERA OF THE HEBRIDEAN ISLES OF COLL, TIREE AND GUNNA, WITH SOME REMARKS ON THE BIOGEOGRAPHY OF THE ISLANDS.

By J. W. HESLOP HARRISON, D.Sc., F.R.S.

As a result of our pre-war investigations in the flora and fauna of the Hebrides, there appeared in May 1939 (*Proc. Univ. Durham Phil. Soc.*, X, 10-23) a preliminary paper dealing with the Lepidoptera of Coll and other members of the Scottish Western Isles. Despite the unfavourable circumstances, our researches have continued during the war period, and various notes detailing important records, and discussing interesting biological facts, have been published in the entomological and other scientific journals. Amongst these many have dealt with the biota of the Coll-Tiree group. In particular, in a note in the *Entomologist's Record*, LV, p. 27, I ventured to make certain deductions based in part on Coll and Tiree insects, concerning the origin and development of Hebridean plant and animal life. Lately, in preparing a lengthy contribution on the biogeography of the Inner and Outer Hebrides, to be published shortly, the whole of the facts there set out, with many others, have been subjected to critical revision, and I have seen no reasons whatever for altering my earlier views. In my opinion, in Coll and Tiree, as well as in the Outer Isles and the Rhum, Eigg, Muck and Canna series, there exist two main floristic and faunistic components. One of these I regard as Eu-Hebridean and endemic, inasmuch as it has been evolved in the Hebridean region from immigrants reaching the area at a period of high land level. This occurred either in the last Interglacial period or in late glacial times during that time of amelioration when the Palaeolithic Aurignacean culture flourished (i.e. in the Zone II of Jessen). The second element, diverse in its content and including the American forms and others of more southern proclivities, I picture as entering Coll and Tiree (or what then represented them!) at a stage of low sea levels in Preboreal or early Boreal times (Zone V and the initial Portions of Zone VI of Jessen).

Recently (1945), Ford, in his "Butterflies," has put forward views on the origin of the British Rhopalocera. From these I am in almost complete disagreement, so doubtful do many of them appear in the light of known facts. More especially is this so in the case of his pronouncements about the Hebridean fauna on page 320 of his book. These result from an almost total neglect of much recent, and pertinent, geological and other investigations. He seems completely unaware of the fact that in late glacial times, when the second 100 foot raised beach marked the level of the Hebridean sea, Coll and Tiree were practically awash, and at most represented by a series of isolated, rocky skerries, incapable of maintaining more than very limited and specialized forms of life. In my mind, this demands, with complete rigidity, when due cognizance is taken of the present Coll and Tiree biota, an inflow of plants and animals from all directions in Preboreal or Boreal times. This, in turn, necessitates post-glacial land connections between the island group on the one hand and the Outer Isles, the Rhum series, and the mainland of Scotland and Ireland on the other.

In this paper, therefore, in order to supplement the evidence of the flora, it is proposed to bring together a list of the Lepidoptera of Coll,



Tiree and Gunna. Thus other workers will have material upon which to formulate their own conceptions on the course of events giving rise to the present populations of the islands concerned.

*Pieris brassicae*, L.; *P. rapae*, L. Casual immigrants, the former often plentiful.

*P. napi*, L. Common on Coll and Gunna, but quite rare on Tiree; in both broods in a form calling for no special remarks.

*Aglais urticae*, L. Common on all three islands.

*Nymphalis io*, L. Sparingly in the Breachacha area of Coll.

*Vanessa cardui*, L.; *V. atalanta*, L. Also frequent immigrants, and not rare in some years.

*Argynnis aglaia*, L. Of fairly common occurrence locally on Coll is the ab. *scotica*, Watk., although signs of admixture with the mainland form are discernible.

*A. selene*, L. A little dark form is widespread on Coll; this is, of course, f. *insularum*, Harrison.

*Euphydryas aurinia*, Rott. In Tiree on a secluded marshy strip supporting the Devil's Bit Scabious in the An Cnap area; very abundant on similar ground on Gunna. All the individuals caught approximated the Irish form *praeclara*.

*Eumenis semele*, L. Well distributed on the sand dunes on Coll and Gunna. The form, which agrees racially with examples collected on Sandray, Pabbay, and Vatersay in the Outer Isles and in Rhum and elsewhere in the Inner Hebrides, is separable from mainland examples by its brighter and more contrasty colouration. In particular, the under surface of the wings is blacker and the yellow portions more orange. This insect may be known as subsp. **atlantica**, the type, in my possession, originating in Vatersay.

*Maniola jurtina*, L. Throughout all three islands, particularly on the margins of the sand dunes in a brilliant form of subsp. *splendida*, B. White, agreeing in general with Outer Island and Canna specimens.

*Coenonympha tullia*, Müll. Only on the Isle of Coll, more especially around the lochs as in the case of Lochs Cliad and its neighbours; always as subsp. *scotica*, Stgr., and of free occurrence.

*C. pamphilus*, L. Widely distributed on the islands from May to August.

*Callophrys rubi*, L. Attached to heather and bilberry on Coll, chiefly in the areas south east and north west of Arinagour.

*Polyommatus icarus*, Rott. Depends chiefly upon *Lotus corniculatus* and *Trifolium repens*, and is therefore found in abundance on the dunes. As the former plant occurs also on rock ledges, and amongst heather, colonies of the Common Blue are encountered on the drier moorlands and in sunny gorges. Racially, like Outer Island examples, the population belongs to subsp. *clara*, Tutt. The insect flies on all three islands from May until August.

*Laothoe populi*, L. Ova, larvae and imagines captured on *Salix aurita* and aspen on Coll; in the absence of aspen, and the extreme rarity of Salices on Tiree scarcely likely to be noted there.

*Cerura furcula*, L. Larvae from *Salix aurita* at the north east end of Coll.



*C. vinula*, L. In some plenty on Coll; generally distributed wherever sallow and aspen grow.

*Clostera pigra*, Hufn. On Eilean Ornsay, lying off Coll. S.E. of Arinagour.

*Tethea or*, Fab. Larvæ not rare on aspen; Coll only.

*Lasiocampa quercus*, r. *callunae*, Palmer. Of frequent occurrence on Coll moorlands.

*Macrothylacia rubi*, L. Not rare in Coll and Gunna.

*Saturnia pavonia*, L. On all heather lands on Coll.

*Spilosoma lubricipeda*, L. Along ditches, chiefly in the Gallanach area, Coll.

*S. lutea*, Hufn. Sparingly, Arinabost Farm, Coll, and Scarinish, Tiree.

*Phragmatobia fuliginosa*, L. Larvæ on Coll late in the season; imagines at Salum in Tiree, as well as at Cornaigmore on Coll and on Gunna.

*Parasemia plantaginis*, L. Fairly general on Coll; Salum on Tiree. The form *hospita* is present.

*Arctia caja*, L. Far from rare; on all three islands.

*Apatele menyanthidis*, View. Larvæ on Salix, Erica, Calluna and Myrica on Coll.

*A. euphorbiae* var. *myricae*, Gn. Larvæ on Myrica along Loch Cliad, Coll.

*A. rumicis*, L. A general feeder, but preferring Iris on Gunna and Coll.

*Euxoa tritici*, L. On ragwort in the dunes.

*Lycophotia varia*, Vill. Amongst heather on Coll.

*Actebia praecox*, L. Larvæ in quantities on the exposed roots of Marram grass on the shores of Vaul Bay, Tiree.

*Amathes agathina*, Dup. Larvæ on heather on Coll.

*A. glareosa*, Esp. Also collected as larvæ on Coll.

*A. baja*, Fab. A few behind Arinagour, Coll, at ragwort.

*A. xanthographa*, Fab. Common in its duller varieties on ragwort, Coll.

*Diarsia brunnea*, Fab. Larvæ on various low plants; Arinagour and Gallanach, Coll.

*Triphaena comes*, Hb. Types, var. *rufa*, Tutt, var. *rufa-nigrescens*, Tutt were bred freely from larvæ taken at several points on Coll; the same forms were captured on ragwort on the hill behind Arinagour.

*T. pronuba*, L. Many forms bred and captured on Coll and Tiree.

*T. ianthina*, Esp. Types and var. *virgata*, Harrison on Coll.

*Ceramica pisi*, L. Larvæ on Coll and Gunna.

*Cerapteryx graminis*, L. Abundant on Coll and Gunna.

*Bombycia viminalis*, Esp. Larvæ beaten from sallow on Coll.

*Apamea monoglypha*, Hufn. Common enough everywhere, with melanic forms.

*A. secalis*, L. Also quite plentiful and generally distributed.

*Procus strigilis*, L. At rush and other flowers on Coll.

*P. versicolor*, Borkh. At ragwort, Arinagour, Coll; three Hebridean islands, Raasay, Rhum, and Coll, have now produced this insect, first discovered by us in the British Isles ten years ago.

*Celaena haworthii*, Curt. Taken casually near Loch a' Mhill Aird, Coll.

*Hydroecia lucens*, Frey. Not rare, around Loch Eatharna, Coll.

*H. crinunensis*, Burrows. Well distributed on Coll.

*H. micacea*, Esp. Common on ragwort, Coll.

*Coenobia rufa*, Haw. Taken once, flying in the setting sun, Loch Cliad, Coll.

*Arenostola pygmina*, Haw. Also captured singly on Coll.

*Stilbia anomala*, Haw. Drumm Flishaig, along the cliff supporting the big juniper, Isle of Coll.

*Caradrina clavipalpis*, Scop. Common on flowers on Coll.

*Amphipyra tragopogonis*, L. Abundant on ragwort, Arinagour, Coll.

*Cerastis rubricosa*, Fab. In the red var. *rufa*, and the pale form *pallida* at sallow catkins in spring on Coll.

*Orthosia gothica*, L. Vars. *rufescens*, Tutt, and *pallida*, Tutt, on Coll, with intermediates.

*O. stabilis*, View. Parallel forms to the preceding; likewise taken at sallow on Coll.

*O. incerta*, Hufn. In small numbers in the paler forms on Coll; one beautiful mottled red and white female was obtained.

*O. gracilis*, Fab. The commonest of the genus on Coll; the vars. *pallida*, Tutt, and *rosea*, Tutt, prevail; larvae are not uncommon in spun meadowsweet heads on Gunna.

*Agrochola lota*, Cl. Larvae beaten from *Salix aurita* on Coll early in June.

*Anarta myrtili*, L. Larvae on heather on Coll.

*Phytometra viridaria*, Cl. Found in some numbers in several stations on Coll where milkwort was common.

*Polychrysis moneta*, Fab. Larvae very scarce on monkshood at Arinagour, Coll.

*P. gamma*, L. Common as an immigrant on all three islands.

*Abrostola tripartita*, Hufn. Occurs freely wherever *Urtica dioica* colonies exist on Coll.

*Hypena proboscidalis*, L. Not rare but somewhat local on Coll and Tiree.

*Scopula ternata*, Schr. Scattered on the Coll heaths from Bousd to Arileod.

*Ortholitha chenopodiata*, L. In a very richly coloured form between Breachacha and Kilbryde, Coll.

*Anaitis plagiata*, L. Far from rare on Coll, especially in sheltered rocky places; also on Gunna.

*Eulype subhastata*, Nolcken. Larvae not rare on Myrica on the Loch edges between the Machair Mor and Loch Cliad on Coll.

*Lygris testata*, L. Common enough on Coll and Gunna.

*Cidaria fulvata*, L. Larvae in abundance on the Burnet Rose on rocks north of Loch Cliad.

*Dysstroma truncata*, Hufn. In small quantities on Coll and Gunna; the var. *commanotata* on Gunna.

*D. citrata*, L. Plentiful everywhere on Coll and Gunna.

*Lyncometra ocellata*, L. On the moors of Coll.

*Chloroclysta miata*, L. Larvae on Salices and birch on Coll.



*Thera cognata*, Thnb. Beaten as larvae at all points where juniper grows on Coll; most common near Loch a'Mhill Aird.

*T. juniperata*, L. With the preceding as the var. *scotica*.

*Xanthorhoe designata*, Rott. Occasionally on Coll.

*X. montanata*, Bkh. Probably more abundant on Coll and Tiree than our records show.

*X. fluctuata*, L. In small numbers near Scarinish, Tiree; the form is quite dark.

*Epirrhoe alternata*, Müll. On the Tiree sand dunes at Kilkenneth, on the Crossapol and Gallanach dunes on Coll; only the form *obscurata*, described from the Outer Isles, occurs.

*Colostygia salicata*, Hb. Near Ruaig on Tiree.

*C. multistrigaria*, Haw. Not common on Coll in April.

*C. didymata*, L. In a rather dark form on Coll, Tiree and Gunna.

*Euphyia bilineata*, L. Abundant as var. *atlantica*, Stgr. on all three islands.

*Perizoma albulata*, Schiff. Common on Coll; the ab. *hebudium*, Weir, is present, with intermediates between it and the type, on dunes and moors.

*Hydriomena furcata*, Thnbg. Larvae not rare on willow and hazel, Coll only.

*Operophtera brumata*, L. Very local; found only on *Prunus spinosa* behind Coll Church on the moorland.

*Eupithecia goossensiata*, Mab. Not common amongst heather.

*E. castigata*, Hb. As the preceding.

*E. nanata*, Hb. Quite common on the moorlands.

*Abraxas grossulariata*, L. Very common in sheltered heathery places; feeds on *Calluna*, *Erica*, *Corylus* and *Salix*.

*Cabera pusaria*, L. Amongst birch on Coll.

*C. exanthemata*, Scop. Amongst willow and birch; rarer than its ally.

*Crocallis elingvaria*, L. Larvae obtained from birch on the Dairy Loch, Coll.

*Alcis repandata*, L. A few greyish specimens near Friesland, Coll.

*Gnophos obscurata*, Schiff. A single example on the cliff face near Hyne, Coll.

*Nyssia zonaria*, Schiff. In very great numbers; on Coll on the dunes from Crossapol to Sorisdale, but invading cultivated land at Torasta; on the dunes on Gunna and from Bharrapol to Salum on Tiree. Only the small subspecies *atlantica*, Harrison, occurs.

*Ematurga atomaria*, L. Very dark examples are to be taken everywhere.

*Zygaena purpuralis*, Brun. In small numbers on Gunna.

*Z. filipendulae*, L. Somewhat rare in rocky gorges on Coll; plentiful on the moors, and rarer on the dunes on Gunna.

*Hepialus humuli*, L. Common and quite typical near Scarinish, Tiree.

*Peronea variegana*, Schiff. Plentiful on hawthorn, Breachacha, Coll.

*Depressaria nervosa*, Haw. Common opposite Eilean Ornsay on Coll, where the food plant, *Oenanthe crocata*, grows on the beach.

*Phlyctaenia fuscalis*, Schiff. On heather moors, Coll and Gunna.

*Pyrausta purpuralis*, L. Rarer than the last-named insect and in the more rocky places.

**A NORTH SOMERSET MEDLEY: LEPIDOPTERA IN 1945.**

By J. F. BIRD, F.R.E.S.

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*(Concluded from p. 53.)*

REARING *NYCTOSIA OBSTIPATA*.—As previously mentioned, two *Nyctosia obstipata* ♀'s were taken at light in September, on the 19th and 21st. The first was bottled immediately as it appeared rather unusual owing to the obscuration of the white annular spot on the forewings, which is generally a distinguishing feature. The second specimen I kept for ova, so placed her in a glass petri-dish with a leaf of some composite plant, picked haphazard in the dark, for her to oviposit on. She lived three days, but in that time laid 31 eggs, deposited in little groups of two or three, along the edge of the leaf. The young larvae began to hatch out on 30th September, when I gave them a few samples of low plants to choose from and noticed that they showed a preference to dock, upon which pabulum the brood, with one exception, thrived. When young the tiny green larvae coil themselves while in repose, clasping some slight projection on the edge of a leaf, or on the underside, where they remain throughout the day, and, apparently, only feeding at night; but as they grow this coiling habit decreases until, finally, they rest outstretched on the leaf. They are very quiet little creatures and no trouble to rear, for they do not start crawling about all over the place, as so many young larvae habitually do, when one is supplying them with fresh food. Several varieties of the larvae are described in the text books, but I fancy these caterpillars alter at different periods of their larval life; being uniformly green to start with, becoming progressively variegated until half-grown, thereafter the markings gradually fade in intensity, and when fully grown the larva becomes yellowish-green with only slight indications of the once strongly-marked pattern. At this stage my larvae were removed from the petri-dishes, in which they had been kept, and placed in a glass globe prepared for their reception with a layer of sterilized soil, about an inch deep, for them to spin their slight cocoons in. This they commenced to do on 19th October; and by the 22nd all had gone down, except one which had remained very small and had a shrivelled appearance. Thinking, perhaps, a change of diet might prove beneficial, I tried the laggard with the tips of groundsel to which it took immediately, attacking the flowers and buds, with the result that it filled out and grew rapidly; and on 27th October, it spun up in the earth, five days later than all the others. I would not, however, recommend a diet of groundsel under ordinary circumstances, for it is decidedly purgative, so far as this species is concerned. The first moths—six in number—emerged on 1st November, and by the 7th, all had reached the imaginal state, excepting the laggard which did not put in an appearance until 14th November. I was, therefore, successful in rearing a perfect specimen from every egg laid—19 males, and 12 females—and, as is usually the case, most of the females were the last to come out. In reference to this species Barrett remarks: "Hardly variable in either sex." This is only true so far as the female is concerned, as the males appear to vary rather considerably; ranging from lightly-lined to extremely dark-banded specimens, with intermedi-



ate variations. When newly-emerged a beautiful violet sheen, along the borders of the wings, is perceptible, but this, apparently, is largely evanescent. It was gratifying to find that my bred specimens were noticeably larger than any we have caught, excepting the last to emerge which is about the same size as the latter.

OTHER CAPTURES AND OBSERVATIONS.—On 20th August, Mr H. Audcent brought me a specimen of *Herse convolvuli* ♂, found on the road at Clevedon; unfortunately not in cabinet condition, so I allowed it to escape. A larva of *Deilephila elpenor*, found by another friend, not an entomologist, crawling on the pavement in the town, on 15th August 1944, produced a fine male on 6th May. *D. porcellus*, usually common at valerian in June, was curiously scarce, and only one was observed, on 11th June. Although *Eilema griseola* was common at light, only the type were attracted, but two specimens of var. *flava* were otherwise obtained; one netted at dusk in a marshy locality, and the other at the flowers of ragwort growing on a hillside, appearing very inconspicuous against the yellow bloom as seen by the light of an electric torch. Also, on the ragwort-blossom, we came across several *Gnophos obscurata*, a pretty sight by torch-light, like dark butterflies with wings half upraised. *Rhyacia simulans* seems to be establishing itself in the County, for my son and I captured three more off valerian in my garden, between 20th and 26th June; whilst another collector netted one, and missed a second, at Weston-super-Mare. *Triphaena interjecta* is said to dart along the hedgerows "in the late afternoon." Would it not be more correct to say "at sundown?" We noticed that several started to fly rapidly along the borders of a wood, while the sun was on the point of setting, on 3rd August; and so swift and erratic was their flight that my son only succeeded in netting one; but we took another off ragwort at dusk, besides a third at light. On 1st September, my son bred an example of the second generation of *Hadena lepida*, the first time we have done so. Besides obtaining *Eumichtis lichenea* at light, we also took one at ivy-blossom. We were not very successful with this attraction, and the only other species worth mentioning were *Amathes glareosa* and *Aporophyla nigra*. Two rather nice forms of *Apamea sordens* ♂, were taken in May; one, pale ashy-grey, apparently ab. *grisescens*, Stg., and the other a rather plain reddish specimen. *Coenobia rufa* is not uncommon near Clevedon, and my son netted several. In the same locality he took *Comacla senex*, *Nymphula nymphaeata*, *Schoenobius forficellus*, and *Chilo phragmitellus*. *Plusia gamma* was exceptionally abundant, and were seen from 11th May to 21st November. A remarkable incursion of the moth took place on 17th September, when 300, or more, swarmed into the room, attracted by the light, and were seen clustering on the electrolier, on the walls, furniture, everywhere in fact. Curiously enough, hardly anything else was attracted that night, three or four species at the most, and, in contrast, one solitary *P. chrysitis*! I examined the invaders for varieties, but saw nothing remarkable; however, I took a specimen each of the darkest and lightest that I could see as mementos of the occasion.

**BRITISH ANTS AS AT PRESENT KNOWN, WITH SOME REMARKS,  
AND A LIST OF THE SAME.**

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

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When studying "A Check List of British Insects" by Messrs Kloet and Hincks—a most useful, painstaking and valuable piece of work—I was reminded that for some time I have intended to publish an up-to-date list of the British *Formicidae*. As it is now nearly 20 years since the publication of the 2nd Edition of "British Ants," some alterations in the list have become necessary. I will first of all review the *Formicidae* in the above-mentioned Check List; with which I have little fault to find. Of course, it was impossible for the authors to deal with tribes, subgenera, varieties and the like; for this would have made a list dealing with over 33,000 names, far too bulky. There are, however, the following few points which, in my opinion, require correction:—

*Ponera punctatissima*, Roger, is noted as a casual immigrant, or adventive species. I personally regard it as not only a well-established species, but not necessarily an introduced one at all. In Botanic Gardens such as at Kew, and elsewhere, it has been probably introduced, but there are various records of its occurrence in the open. Also during the last two years I have found it in some numbers in vegetable refuse at Lampton, Middlesex, far from any houses. Holger Holgerson, in a recent paper on this ant in Norway, states as his opinion that "... the species has not been introduced in this country [Norway] or in Finland, where it—as well as in Great Britain—has been found under similar conditions. It may well be possible that colonies found in hot-houses in botanical gardens may be descended from introduced specimens (Helsingfors, Copenhagen, etc.), but indigenous colonies of the species, which in the north of Europe may be regarded as a relict from a warmer (post-glacial) epoch, may doubtless be found in nature in suitable places . . ."

Our authors point out that "a specialist in any particular group of insects always knows many things which are not yet published, and are, therefore, not common knowledge to the mass of entomologists." I would go further and say he knows many things which have been published, but if they have not been commented on, or reproduced in any known book or paper, will only be known to a very few other specialists in his own group. As a case in point, *Myrmica rubra*, L., is given as a synonym in part of both *M. laevinodis*, Nyl., and *M. ruginodis*, Nyl.; but Santschi, in 1931, gave good reasons to show that *M. ruginodis* sinks as a synonym of *M. rubra*. This I indicated in my list of the type species of ants.

*Myrmica sabuleti*, Mein., is incorrectly treated as a synonym of *M. scabrinodis*, Nyl. *M. sabuleti* has generally been considered as a variety of *scabrinodis*; but I now consider it, in common with other myrmecologists, to be a good species. Holger Holgerson in his excellent little book on the ants of Norway writes:—"Usually *Myrm. sabuleti* is regarded as a variety of *Myrm. scabrinodis*. In Rogaland, where I have had the occasion to observe both species very often, they have rather different habits, and this in connection with the circumstance that they always can be easily distinguished by their systematic characters, makes



me inclined to regard *Myrm. sabuleti* as just as good a species as *Myrm. scabrinodis*." With this I entirely agree.

As to *Acanthomyops* and *Lasius*, I still agree with the validity of the Erlangen List, and I do not propose to accept the name *Lasius*, F. This is, of course, a matter of opinion; and I am also aware that the International Commission on Zoological Nomenclature has decided otherwise. In view of the fact that Nomenclature still seems very slow in becoming stable, and that anyone who wants to get a name conserved appears able to do so without difficulty, I feel unable to come into line with a decision which wipes out for reasons outside Nomenclatural ones many names which are valid, acceptable, and contribute much to the stability of the Nomenclature of the Hymenoptera. These I know to be the views held by Mr Tams. I also agree with Mr Bainbrigge Fletcher when he says he declines to admit the right of Zoologists to regulate Names in Entomology.

Coming to the genus *Formica*, *F. glebaria*, Nyl., is not, of course, a synonym of *F. fusca*, L. Indeed, Emery regarded it as a subspecies, and not a variety, of *fusca*.

*F. picea*, Nyl., as I have pointed out before, should really be called *F. transkaukasica*, Nasonow. When I criticized the List of the British *Formicidae* published by the R. Ent. Soc. London, I unfortunately did not ask for any reprints of my paper in question. This I propose to have reprinted, and to include it with this paper, for many of the points referred to are treated at greater length, and it will thus save republishing the same matter. I must thank Mr W. H. T. Tams for kind advice on this paper. I now append a List of the British *Formicidae*; as in my judgment it should appear.

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(To be concluded.)

### THE OCCURRENCE OF THREE MERMITHOGYNES AT ROUNDSTONE, CONNEMARA, WITH NOTES ON THE ANTS OF THE AREA.

By FERGUS J. O'ROURKE, B.Sc., F.R.E.S.

Mermithogynes are brachypterous female ants whose condition is due to the fact that they harbour in their bodies endoparasitic nematode worms of the genus *Mermis*. So far as is known the species is, in all the cases occurring in Europe, *Mermis myrmecophila*, Baylis, which was described by Baylis (1) in 1921 from specimens emerging from *Acanthomyops* (*Donisthorpea*) *niger*, L. The following specimens were

taken by me in Roundstone, Co. Galway, and they appear to be the first records of the occurrence of these forms in Ireland.

*Acanthomyops (Donisthorpea) niger*, L.

This specimen ( $R_3$ ) was found in a nest under a stone in damp peaty soil containing normal males, females and workers on 22nd July 1944.

The wings are approximately 56% of the length of those of a normal female taken from the same nest. They show the typical pattern of veins. The veins are, however, denser than normal and since they are almost normal in width they occupy a relatively greater area of the wing than in the normal form.

The enlargement of the abdomen characteristic of mermithogynes is noticeable in the length of the first four dorsal gastric tergites (which together make up by far the greater part of the length of the gaster), which is 16% longer than in the normal littermate taken for comparison in which the length was 3.7 mm.

For further measurements see Table I.

TABLE I.

Specimen.	Length of Forewing.†	Length of Hindwing.†	Wing Spread.	Width of Gaster.††
Norman Littermate	9.55 mm.	6.50 mm.	20.8 mm.	2.90 mm.
Mermithogyne, Rz.	5.50 mm.	3.5 mm.	12.5 mm.	3.100 mm.

†Measured as the maximum length from the proximal end of the wing to the nearest 0.05 mm.

††Measured as the width of the posterior border of the 2nd gastric tergite—a convenient point at which to take a measurement and also frequently the point of maximum width.

*Acanthomyops (Chtonolasius) flavus*, F.

*Specimen R<sub>1</sub>*—taken 15th July 1944 from a nest in damp peaty soil 300 yards further North along the same lane in which the previous specimen was taken. (The spot can be found on the 6 inch Ordnance Survey Map, Galway, Sheet 50:52 cms. West; 5 cms. North.) There were other normal winged forms in the nest.

In this specimen the wings are a little more than 50% of the normal length but preserve their normal symmetry both with respect to their venation and the ratio between the lengths of fore and hindwings, which retains its normal ratio of roughly 3:2. The veins are ochreous instead of the usual pale yellow and considerably denser in the proximal half of the wing. The pterostigma is very dark indeed. The entire wing is infusate whereas it is normally hyaline in its distal half. The gaster is 25% broader than usual.

For other measurements see Table II.

*Specimen R<sub>2</sub>*—from a nest in peaty soil, 15th July 1944, on the North side of the road near Creggduff Bridge Roundstone. There were not any other winged forms in this nest.

In this mermithogyne the gaster is smaller than that of a normal female. The wings are 60% of the usual length and, as in the previous specimen, entirely infusate. The venation, although darker than usual, is normal in width and pattern and the wings as a whole preserve their symmetry.

See Table II for measurements.



TABLE II.

Specimen.	Length of Forewing.	Length of Hindwing.	Wing Spread.	Width of Gaster.
Mermithogyne R <sub>2</sub>	5.25 mm.	3.40 mm.	12.00 mm.	2.30 mm.
Mermithogyne R <sub>1</sub>	4.60 mm.	2.95 mm.	10.30 mm.	3.10 mm.
Normal Litter-	8.45 mm.	5.75 mm.	18.05 mm.	2.50 mm.
mates of R <sub>1</sub>	9.00 mm.	5.70 mm.	18.90 mm.	2.40 mm.

No further parasitised forms were found in the locality either in 1944 or when the area was revisited in the last fortnight of July 1945.

Some notes are added on the ants of the district, all of which have been found within a radius of 3 miles of Roundstone village.

*Acanthomyops (Donisthorpea) niger*, L.

The commonest Formicine ant of the area, its nests being nearly twice as frequent as those of *A. flavus*. Winged forms were present in all nests by 19th August 1942 but swarming did not take place until the late afternoon of 23rd August, on which date the sea in Roundstone Bay was covered with winged ants, mainly *A. flavus*, but also *A. niger* and a few male *Myrmicas*. I came up the bay from Innislacken in a curragh about 6.30 p.m. (Irish Summer Time) and counted up to 50 per square foot and never less than 3 or 4. If we take an average of 100 to the square yard the number of ants lost on the water numbered some 500 millions, for the area involved (measured on the 6 inch map) was not less than 5 million square yards. This gives one a remarkable impression of the numbers of ants involved in a swarm. No doubt the number must run into billions where, as usually happens, thousands of acres are involved. Although no fish were observed taking the ants, no doubt they did, for Wheeler records fossil fish excrement from the tertiary lake at Florissant which consisted "almost entirely of the hard indigestible heads of ants" (8: p. 164).

In 1944, although winged forms were found in some nests on 15th July, and in nearly all nests a day or two later, swarming had not occurred by 30th July. In 1945 swarming may have occurred before 17th July for there were no winged forms in the nests on that date nor did any appear within the next ten days.

At Ellistrin on 22nd July 1944 foraging workers were taken 13 feet 8 inches from the nest—giving a feeding territory of about 60 square yards (using the formula  $3.14 r^2$  where  $n$  is the maximum foraging distance), an area which is greater than that obtained by Pickles at Garforth, Yorkshire, where the area was 35 square yards (6).

17th July was a gala day for this species at Creggduff, where hundreds of workers could be seen out capturing the swarming *Myrmicas* (q.v.). A colony of this species was found living in plesiobiosis with a colony of *A. flavus*, 27th July 1945.

*Acanthomyops (Donisthorpea) alienus*, Först.

A worker of this uncommon species was taken on the island of Innislacken in Roundstone bay on 23rd August 1942. This is an interesting record as the species has hitherto been recorded in Ireland only from West Cork, Clare, Dublin, Wicklow and West Mayo.

*Acanthomyops (Chthonolasius) flavus*, F.

Winged forms were to be found in the nests on 14th July 1944, though swarming had not occurred by 30th July. On 15th July at Errisbeg it was very noticeable that some nests contained only males and no winged females, while the reverse occurred in other nests. The same situation was observed in 1945, about 20% of the nests having males only, the other 80% having mainly winged females. As these nests were not dug out it is possible, although unlikely, that their appearance was deceptive. I have already noted (3) the same phenomenon at Howth, Co. Dublin. W. M. Wheeler (8: p. 183) also comments on the fact and makes the likely suggestion that it facilitates cross fertilization.

In 1945 winged forms were to be found in nests by 17th July, although swarming had not occurred by 30th July, and they were negatively phototropic on 27th July. On 27th July naked pupae were found in two nests.

*Formica fusca*, L.

This species, which is quite common in the South and East of Ireland, tends to become much less common as one goes north-westward. In three separate visits to the Roundstone area I have seen less than a dozen colonies and only on one occasion, 27th July 1945, did I see winged forms and then only females.

*Leptothorax (Mychothorax) acervorum*, F.

The only winged form seen was a flying female taken at Ballyrobick on 17th July 1944. As the numbers of this species are so small this may be considered a swarming date, especially as the other Myrmicinae swarmed on the same day. Workers have been taken running with those of *Myrmica scabrinodis* at Creggduff on 17th July 1944 and with those of *M. schenki* on 27th July 1945. *Leptothorax* was frequently found foraging on bare rock, the site of the nest being very difficult to find.

*Myrmica laevinodis*, Nyl.

A small swarm numbering some hundreds took place on 16th July 1944 followed on the next evening at 8 p.m. (Irish Summer Time) by a widespread swarm at Creggduff in which *M. ruginodis* and *M. scabrinodis* also took part. Several counts showed that males comprised 90% of the swarm. The average density along a mile and a half of the road was not less than 100 per square yard and the area involved included fields on either side of the road. How extensive the area involved was not determined but the number along the mile and a half of the road alone would be more than two and a half million ants or approximately half a million per acre. If we assume that every nest produces 500 winged forms—probably a rather high figure—we can derive the number of nests per acre as 1000 and assuming an average worker population of 1000 per nest, a figure which is not unreasonable, cf. Pickles' figures for Thornhill, Yorkshire (7), we get one million ants per acre as the lowest density of Myrmicine ants. The lowest density is the number of ants per acre in a large area and, as Pickles (*loc. cit.*) points out, gives some measure of the biological success of the group over a large tract of country. If we allow a similar figure for the Formi-



cine species—a not unreasonable assumption in view of the figures already given above under *A. niger*—we arrive at the figure of two million ants per acre. This seems enormous but agrees remarkably with the figure 2,946,125 ants per acre derived by Morris (2) in 1922 for land dressed annually with farmyard manure at Rothamstead. Pickles gives what are probably more accurate figures for a smaller area at Garforth, Yorks, 1935. *A. niger*, *M. scabrinodis* and *F. fusca* give a lowest density figure of 60,388 per acre between them (6).

On 22nd July 1944 no winged forms were to be found in nests.

Swarming had not occurred by 30th July 1945 and on 27th July the sexes to be found in the nest were negatively phototropic.

#### *Myrmica rubra*, L.

On 17th July 1944 this species took part in the swarming referred to under *M. laevinodis* and which was the object of the attacks of *A. niger* already referred to; by 22nd July no winged forms remained in the nests. While winged forms occurred in nests on 17th July, swarming had not occurred by 30th July 1945.

#### *Myrmica laevinodis*, Nyl., var. *ruginodo-laevinodis*, Forel.

I have already recorded the occurrence of this form at Recess, West Galway, where Mr P. A. Heelan obtained specimens for me (4). This form occurs at Roundstone under two different aspects—one has a *laevinodis* facies but with long epinotal spines; the other has short weak spines but otherwise the *ruginodis* facies.

#### *Myrmica scabrinodis*, Nyl.

A single flying female was taken at Errisbeg on 22nd July 1942 and the following evening at 5 p.m. (Irish Summer Time) the species swarmed in some numbers (thousands) on the island of Innislacken. It will be noted that this was the date of the large Formicine swarm referred to above. In 1944 the species swarmed on 17th July with the other *Myrmicas* but on 22nd July some nests still had winged forms. On 27th July 1945 three nests were found in wet marshy ground and all had very dark melanic workers of which three-quarters were micrergates. Three of the nests contained winged forms; one had, however, only a single male.

#### *Myrmica sabuleti*, Meinert.

About one-third of the *scabrinodis* colonies were of this variety; winged forms occurred in nests on 17th July 1945.

#### *Myrmica schenki*, Emery.

I have already recorded this rare ant from Roundstone (5). In 1945 it was found to be distributed widely though scarcely around the area.

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## MELICTA (MELITAEA) ATHALIA R. PARVANIGRA, VERITY.

By B. J. LEMPKE.

In his monograph on *M. athalia*, Rott. (1940, *Trans. R. Ent. Soc. London*, **89**), Verity described a new race, *parvanigra* (l.c., p. 644), and figured it on pl. 5, fig. 108 (♂) and 109 (♀). This race, distinguished from the typonominal one from Paris by its smaller size and darker upper side, was only known by Verity from one locality, viz., Bijvank in Holland.

The Bijvank is a rather small, but very fine old wood and lies on the frontier of the Dutch province of Gelderland and Germany, north-west of the German town of Emmerich (on the Rhine). It contains a great variety of bushes, trees and low plants. No wonder that the lepidopterological fauna is very rich. L. H. Scholten gave an extensive list of the Macrolepidoptera which he met with in this wood and the neighbouring hills in *Tijdschr. voor Ent.*, **81**, 127-229, 1930. More than half the total number of the Dutch Macros are to be found there.

It is, of course, not to be expected that the special *athalia* race would only be found in this very restricted area. I therefore compared the material of several Dutch collections with Verity's description and figures and then it became clear, that everywhere in our country, where *athalia* is met with, it belongs to race *parvanigra*, Vty. A peculiarity of this race is its extremely small variability. There are some specimens in which the black pattern is not so extensive as in the examples figured, but they are exceptions. The great majority of the Dutch race excellently answers to Verity's description and to his figures. It flies in woody localities in the whole east and south of the country. I saw a very typical ♀ from Epen, a small village in the extreme south-east of Dutch Limburg (west of the German town Aix-la-Chapelle).

It is, therefore, evident, that the race also inhabits the part of Western Germany which touches our country, and Belgium, at any rate the greater part of the latter country. The more southward one goes, the greater the chance that transitions to typonominal *athalia* are met with. It remains to be investigated if this happens in the south of Belgium or in the north of France, but the uniformity of the Dutch race is an indication that the habitat of *athalia*, r. *parvanigra*, extends to a rather greater distance and beyond our frontiers. Oude Yselstraat 12 III, Amsterdam, Z.



## A NOTE ON A SPIDER PREYING ON ANTS IN GREECE.

By W. PICKLES, F.R.E.S.

Dr Malcolm Burr (*Ent. Rec.*, 57: 132) gives an interesting account of spiders preying upon harvesting ants on the shores of the Bosphorus. Whilst making observations on a nest of the ant *Aphaenogaster* (*Aphaenogaster*) *testaceo-pilosa*, Lucas, on an area of woodland near Piraeus, Greece, during 1945, I found that the ant was being preyed upon by a small spider. (This has not been identified as there is no Specialist in that branch at the Natural History Museum at present.)

Near the mouth of the nest of the ant there was a considerable midden of excavated soil and vegetable and insect remains. Abutting this midden there was a fairly large stone and the spiders chose to hide beneath it whilst awaiting the appearance of their ant prey. At other times they would lurk round about the mouth of the nest and even at times venture into it for a little way; but usually they came out very quickly. Several ants were seen to be ambushed and carried off beneath the stone.

This procedure was observed many times until 7th May 1945, when something quite different happened. On visiting the nest on this date at 6 p.m. I was surprised to find that six stems of grass which were growing near the entrance to the nest had one or more dead ants attached to them. On closer examination it was found that the spider would go up the grass stems to the dead ants and suck them. The way in which the ants were carried up the grass stems and fastened to them was not observed.

On 7th May there were eight ants thus fastened to the grass stems; two stems having two dead ants on them and the others having one ant each attached to them. The distances of the ants up the stems ranged from one inch to  $4\frac{1}{2}$  inches. As the wind blew, the corpses of the ants swayed to and fro, and the whole thing reminded me of the pictures of the human gibbets which used to decorate the cross-roads in years gone by.

By 19th May 1945 only one of these "gibbets" was present and this was not one of the original ones but a later addition. This ant was fastened to the inflorescence of the grass and not to the stem as were the others. When this nest was next visited on 27th May 1945 this "gibbet" had completely disappeared also.

## COLLECTING NOTES.

PREVENTION OF INBREEDING.—The following notes on a brood of the Lymantriid *Pantana bicolor*, Wlk., may prove of interest.

Ova were obtained from a bred female mated to an attracted male, and all hatched on the same day, about the 10th November. The moults took place at approximately the same time for the whole brood and the females, as is often the case in this family, had an extra instar.

No note was kept of the date on which the first cocoon was spun, but the first males emerged in the evening of the 3rd January. At this date twelve female larvae were still feeding, all subsequently dying of disease.

From the 4th to the 8th January males emerged at the rate of about five daily, thereafter single males emerged on the 11th and 14th, this latter being the last.

The first female emerged on the 12th January, the last on the 19th; emergences being fairly even at the rate of about two a day.

Two unmated males were kept to die a natural death, and lived five days. The male that emerged on the 11th mated on the 12th and again, with a second female, on the 14th, dying on the 15th. It is possible that males in a state of nature would have shorter lives, the cold nights in the Hills would kill them off as soon as they began to weaken.

The females of this species usually deposit all their ova as soon as they have mated, and it will thus be seen that only a very small percentage of the males of a brood will emerge late enough to have the opportunity of mating with their sisters.

Both the females mated to the same male laid fertile ova, but considerably fewer than their mother. This was presumably due to their having been reared in Calcutta, the original ova having been obtained in the Darjeeling Hills.—D. G. SEVASTOPULO, F.R.E.S., Calcutta, 30.i.46.

**PIERIS BRASSICAE, L., ATTACKED BY A HORNET.**—In July 1943 I was strolling towards a Buddleia tree in my garden at Droitwich, Wores., with the object of observing, at closer quarters, the large number of Pierids and Vanessids which were feasting upon the flowers. Whilst still about fifteen yards from the tree I saw a *P. brassicae* apparently detach itself from the flowers and plunge rapidly to earth.

Upon further investigation, I found that this unorthodox behaviour, in a butterfly not especially noteworthy for its speed of flight, was due to the fact that it had been plucked unawares from the flower-head by a worker Hornet.

The *P. brassicae*, a large female, lay on the ground in the grip of the Hornet which evidently meant business. It was no match for the Hornet, however, and my innate sense of fair play prompted me to liberate the butterfly. The Hornet was, however, captured and killed.—NIGEL T. EASTON, Sulby Hall, Welford, near Rugby.

**THERIA RUPICAPRARIA, SCHIFF., AND ITS POWERS OF ENDURANCE.**—Whilst testing the strength of the ice, for skating, during the prolonged cold spell, on 18th January 1946, at Welford, Northants, I came across a male of this species, apparently lifeless, which, having inadvertently settled upon the surface of a large pond, had quickly become enclosed in a casket of ice.

I dug it out with the aid of a pocket-knife and, placing it in a match-box, put it in my pocket. It exhibited not the slightest sign of life but, on my return to the house, the moth, much to my surprise, proceeded to walk out of the box and "took off," confidently flying towards the window, apparently none the worse for its involuntary incarceration!—NIGEL T. EASTON, Sulby Hall, Welford, near Rugby.

**GONEPTERYX RHAMNI, L., IN FEBRUARY.**—On 5th February 1946 a male *G. rhamni* was observed enjoying the sunshine as it flew along a hedge-row bordering the Northampton-Leicester road, about half mile south of Spratton, Northants.—NIGEL T. EASTON, Sulby Hall, Welford, near Rugby.



## EXCHANGES.

- Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.
- Wanted**—American Hesperilidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.
- Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.
- Wanted**—*Lycaena* (*Heodes*) *phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. **Duplicates**.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.
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- Wanted**.—Various monthly parts of *Entomologist's Record* for 1914, 1915, 1916, 1917, 1919, and 1920. Please report any odd monthly parts (in wrappers as issued) prior to these years.—P. B. M. Allan, 4 Windhill, Bishop's Stortford, Herts.
- Wanted**.—Males of *Morpha menelaus*, *M. didtus*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.
- Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.
- Wanted** for purchase or exchange, pupae of *Smerinthus ocellatus*.—E. S. A. Baynes, F.R.E.S., Monkshatch Cottage, Compton Guildford.
- Wanted**.—The two volumes (bound or in parts) of the second "Deuxieme Partie Geometres only of Culot's Noctuae et Geometres d'Europe."—Brig.-Genl. B. H. Cooke, C.M.G., C.B.E., D.S.O., F.R.E.S., 86 Osborne Road, Windsor.
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- Exchange**.—I would like to get in touch with those interested in exchanging living ova and larvae of southern species of Lepidoptera for northern species and adults. Write stating wants and probable offers.—J. K. Goody, Weldon, 26 Carr Wood Road, Bramhall, Cheshire.
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*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: June 5; October 2nd and 16th; at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1.: Wednesday, May 22nd; June 12th; 6.0 for 6.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppell Street, Gower Street, W.C.1: Sectional Meetings on first Tuesday and General Meetings on third Tuesday of each month, 6.30 p.m. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

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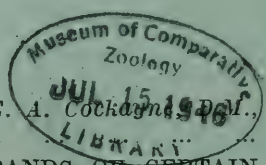
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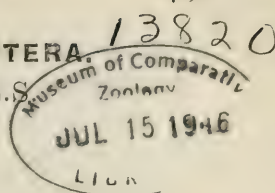
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## ABERRATIONS OF BRITISH MACROLEPIDOPTERA

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

(With 2 Plates.)



The aberrations of British *Noctuidae* and *Geometridae* described below are in my collection unless otherwise stated.

*Agrotis trux*, Hbn., ssp. *lunigera*, Steph.

Ab. **asticta**, ab. nov. (Pl. 1, fig. 1.)

The black ring around the orbicular stigma is absent and there is no trace of the claviform stigma; in other respects it is normal.

Type: ♂, Freshwater, I. of Wight, 1903; Dewar.

*Agrotis ripae*, Hbn.

Ab. **signata**, ab. nov. (Pl. 1, fig. 2.)

Forewing—The ground colour of the median area is pale grey with a faint rufous tinge and that of the marginal area is pale grey; the stigmata are outlined with brown; the submarginal line is bordered internally with dark brown. Hindwing—Whitish with distinct grey-brown submarginal shading. The dark submarginal shading in both wings distinguishes it from other forms.

Type: ♂, Pendine, Carmarthen, 1910; Dewar.

*Amathes xanthographa*, Schiff.

Ab. **pallidior**, ab. nov. (Pl. 1, fig. 3.)

Forewing very pale brownish white with the usual markings faintly visible, hindwing whitish with the marginal shade just visible.

Type: ♂, North Shoebury, Essex, viii.1891; F. J. Hanbury.

Paratypes: 1 ♂, Shoeburyness, Essex, viii.1891; F. J. Hanbury. 1 ♂, Bruckley, Morley Coll., Tolson Memorial Museum, Huddersfield.

*Diarsia festiva*, Hbn.

Ab. **cingulata**, ab. nov. (Pl. 1, fig. 4.)

Forewing—Ground colour pale yellowish grey; a broad blackish band due to a thick sprinkling of black scales runs across the middle of the wing extending from the external border of the orbicular to the post-median line; the submarginal line is present, but faint.

Type: ♂, Woolmer Forest, Hants., 28.vi.1914; J. E. Eastwood.

*Triphaena comes*, Hbn.

Ab. **sagittifer**, ab. nov. (Pl. 1, fig. 8.)

Forewing—Ground colour pale brownish grey; basal, antemedian, and post-median lines blackish brown, the postmedian united to the series of dots lying between it and the submarginal line so as to form a series of marks like arrow-heads; the antemedian is united to the black mark on the costa and to the black dots on the median nervure and nervure 2 so as to form three loops; the orbicular and reniform are filled in with blackish brown.

Type: ♂, F. Bond Coll., Baron Bouck Coll.

I have seen specimens of this aberration from the Hebrides.

*Triphaena pronuba*, L.

**Ab. fumata**, ab. nov.

The ground colour of the forewing is a deep blackish brown with black markings; hindwing suffused with brown becoming yellower towards the base and inner margin.

Type: ♂, Wallasey, 1910; H. Massey.

*Ceramica pisi*, L.

**Ab. pulchra**, ab. nov. (Pl. 1, fig. 6.)

Forewing—From the base to the central fascia the ground colour is pinkish white crossed by the purplish red basal and antemedian lines, which are united by longitudinal lines of the same colour running along the costa, median nervure, and inner margin; the orbicular stigma and all other markings are absent; the purplish red median fascia is quite straight and distinct, the position of the reniform is shown only by the dark line forming its external border and this is continuous with the inner part of the postmedian line. The rest of the wing is normal. The two clear transverse bands of pinkish white and the absence of stigmata and secondary markings make it a very remarkable and beautiful aberration.

Type: ♂, Slichichan, Skye. Bred v.1927; W. S. Gilles.

*Apamea rurea*, F.

**Ab. albata**, ab. nov.

The markings of the forewing are of the usual colour and pattern, but the ground colour is pure white.

Type: ♂, I. of Lewis, Outer Hebrides, 1901; MacArthur.

The parallel form in *Apamea secalis*, L., is ab. *struvei-excessa*, Turner.

*Rusina umbratica*, Goeze. (*tenebrosa*, Hbn.).

**Ab. albescens**, ab. nov. (Pl. 1, fig. 5.)

The forewings, thorax, antennae, legs, and abdomen are bone coloured, the colour of the palest form of *Rhizedra lutos*a, Hbn., and there are no markings whatever. The hindwings are whitish with a faint brown tinge.

Type: ♂, Woolmer Forest, Hants., 23.vi.1914; J. E. Eastwood.

*Amphipyra pyramidea*, L.

**Ab. lutescens**, ab. nov.

The forewings and thorax are paler than usual, and the copper colour of the hindwings is replaced by shining creamy yellow.

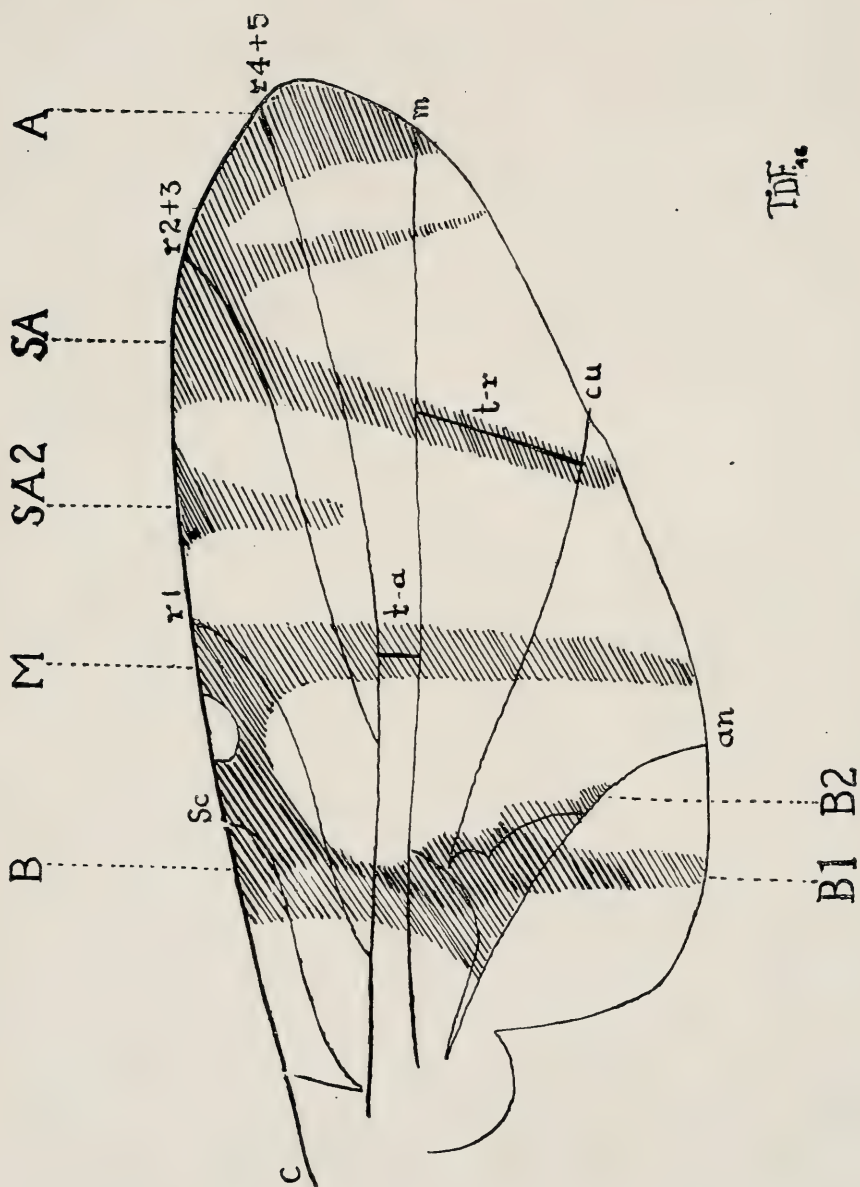
Type: ♂, Tremaine, Cornwall, 23.viii.1932; C.W.W.H., H. B. D. Kettlewell Coll.

**Ab. insignis**, ab. nov. (Pl. 1, fig. 9.)

The ground colour of the forewing is bone coloured and the only markings are the black postmedian line bordered internally by blackish brown to form a dark transverse band, the black stripe joining the postmedian to the inner half of the reniform, the blackish brown ring and central dot of the orbicular, the line joining it to the antemedian, and the antemedian line itself.









Type: ♂, Lydart, Monmouth, 1941. At sugar; Sir Beckwith Whitehouse.

**Ab. melanostigma**, ab. nov.

Thorax paler than usual, the ground colour of the forewing as far out as the sagittate marks, which lie just internal to the subterminal line is very pale ochreous brown; the light transverse lines are lost in the ground colour. The antemedian is represented by three blackish brown dots, the postmedian by a row of blackish dots, and the orbicular by a black dot. The discoidal spot and the dark streak running from it to the postmedian are blackish brown and very conspicuous.

Type: ♂, Brampton, Hants. Bred 1.ix.1925; G. Raynor.

Figured *Proc. South Lond. Ent. and N.H. Soc.*, 1937-1938. Pl. 2, fig. 4.

*Catocala nupta*, L.

**Ab. salmonea**, ab. nov.

The red colour of the hindwings is replaced by pale to medium salmon pink.

Type: ♂, New Forest, Hants., vii.1906.

Allotype: ♀, Croydon, Surrey, 6.ix.1915.

(To be concluded.)

## A SUGGESTED NOMENCLATURE FOR THE WING-BANDS OF CERTAIN TRYPETIDAE (DIPTERA).

### WITH SOME NOTES ON THEIR VARIATION IN BRITISH SPECIES.

(With Plate IX.)

By H. W. ANDREWS, F.R.E.S.

As is well known, the majority of the species of this family have the wings either banded or latticed, and a study of the amount of variation occurring in a number of species of the banded section has led me to the conclusion that definite names are preferable to the practice of calling these bands first, second, third, etc. I would therefore suggest the following names which I have found to work well, viz.:—

**APICAL**—(A in figure) consisting of the darkened area at the wing-tip: reaching normally up to, or a little beyond vein 1, 2 and 3 on the costal margin, and to a little below vein *m* at the apex.

**SUB-APICAL**—(S-A) next to the apical. Extending normally right across the wing, and nearly always having its lower portion coincident with the outer cross-vein (t-p.).

**MEDIAN**—(M) starting at the stigma on the costal margin and coinciding with the inner cross-vein (t-a).

**BASAL**—(B) consisting of the darkened area at the base of the wing. It may extend right across the wing (B1 in fig.) or be deflected along the course of the anal vein (B2 in Fig.) in which case it does not reach the hind margin.

In a few genera there are extra wing-bands which I term:—

SECONDARY APICAL—(A2) running parallel to the inner border of the apical and between this band and the sub-apical.

SECONDARY SUB-APICAL—(S-A2) lying between the sub-apical and median bands, usually in the form of an elongated spot and not extending across the wing.

In this suggested nomenclature the word "band" is used as the most convenient term whether extending right across the wing or not, and it is also used in cases such as *Trypeta ruficauda*, Fab., where the "bands" are reduced to spots.

#### VARIATION (Specific unless otherwise indicated).

The APICAL BAND is the most constant of the wing-markings. It varies from a very slight contraction of the darkened area, e.g., the genus *Myopites*, where it does not extend below vein *m*, or a considerable deduction which in extreme cases leaves it as a mere rim: again it may include a clear spot or spots, or have a single or double clear longitudinal incision varying in depth: these variations are specially noticeable in *Zonosema alternata*, Flin., and *Spilogræpha zoe*, Mg.

The SUB-APICAL BAND is also constant, especially in the lower portion coincident with the outer cross-vein. It is not always continuous, e.g. the genus *Myopites*, where the upper portion is not directly in line with the lower, but is situated nearer the apex of the wing. The most frequent variation in the whole wing-banded group lies in the relation between the apical and sub-apical bands at the costal margin. There may be (1) a form in which they are absolutely united; (2) an intermediate form, in which they are very closely approximated but not actually touching, or with a clear spot at the point of junction; (3) a form in which the two bands are obviously separated. All three forms may occur in the same species, e.g. *Chaetostomella onotrophes*, Lw., or *Urophora jaceana*, Her. Sometimes the sub-apical band fails to reach the costal margin: or the upper portion may be altogether missing as in *Xyphosia miliaria*, Schr.; again it may be interrupted in the middle. Another form of variation takes the shape of a backward bend (i.e. towards base) at the lower margin closely approximated to, or actually touching, a forward bend (towards apex) in the median band. This is the normal form in *Acidia cognata*, W., and *Philophylla heraclei*, L., and occurs rarely as a variation in some other species. In *Myopites blotii*, Breb., specimens occur in which the sub-apical band contains a small clear spot.

The MEDIAN BAND is the most variable, its most constant characters being the stigmatic spot and the infuscation of the inner cross-vein (t-a). In extreme forms even one or other of these characters may be absent. It varies from extension right across the wing to interruptions into two or more portions, which portions in their turn may subdivide into spots. It very frequently fades out before reaching the hind margin. As in the case of the sub-apical and apical bands, specimens in the same species may exhibit differing forms of variation in this band.

The BASAL BAND is also very variable; as stated above it may terminate in different ways (B1 and B2). Often it only extends half-way across the wing, and not infrequently is merely vestigial, e.g. *Zonosema alternata*, Flin., or altogether missing, e.g. *Urophora stylata*, Fab.



The SECONDARY APICAL BAND may be continuous, as in *Acidia cognata*, W.; or interrupted, as in *Philophylla heraclei*, L.

The SECONDARY SUB-APICAL BAND is usually in the form of a somewhat elongated spot: it occurs for example in *Myopites*, *Zonosema*, *Acidia*, *Rhacochlaena*, etc.

There is one common species, *Sphenella marginata*, Fln., which is banded in a different manner to any others and to which my suggested nomenclature does not apply. It has an apical band: an abbreviated band I consider to be sub-apical: and a band extending right across the wing including both inner and outer cross-veins, which are very close together in this species. This band is too near the middle of the wing to be termed sub-apical, and starting on the apical side of the stigma cannot strictly be called median, so for descriptive purposes I term it "central." With rare exceptions it contains one or more clear spots, while both apical and sub-apical bands occasionally contain clear spots in addition to one at their junction on the costal margin.

It not infrequently happens that separate forms of variation occur in the same specimen, one on each wing. The occurrence of these asymmetrical specimens combined with the fact that although individual specimens can usually be assigned to one or other form yet in a long series they can be seen to merge into each other, is to my mind an argument against giving varietal names to extreme forms.

In addition to the recognised variation, individual aberrational forms may occur now and again in any species especially in *Myopites frauenfeldi*, Schin., and *Trypeta falcata*, Scop.

Considering the variations, both specific and individual, in wing-banding given above, I personally am of opinion that such variations are merely those to be found in any organism in a state of evolutionary progress, though this by no means lessens their interest as a field of study. Several biological problems suggest themselves. For example, are such variations the result of, or effected by, differences in locality, soil or environment?; or in the case of species that have two or more host-plants, have such different plants any definite effect on the markings or variations thereof of the flies bred from them, in other words are there "biological species"? Again, what differences, if any, have the different kinds of larval habits and nutrition on the imaginal wing-markings?, and why do some species vary so widely in their wing markings and others hardly at all?

These problems need a great deal of comparison of material from widely different localities, and careful breeding experiments before any considered conclusions can be drawn. Only in one case can I give any decided answer and that a negative one. An analysis of Niblett's "Host-Plants of British *Trypetidae*" shows that the different forms of larval life-history, gall making, berry and seed-head feeding, and leaf-mining, have no effect on the types of wing markings in the imagines: e.g., *U. cardui* (gall maker), *G. wiedemanni* (berry feeder), and *A. cognata* (leaf-miner), are all banded-winged. Thistle heads produce the clear winged *T. serratulae*, the banded-winged *C. onotrophes*, and the spotted-winged *T. ruficauda*. As regards a species with differing host plants, there is a recorded instance\* (relating though to body colour and not

\**Ent. Record*, Vol. 52, p. 100.

wing-markings) where of some 100 specimens of *P. heraclei*, L., bred from larvae found by Mr Audcent mining leaves of Alexanders (*Smyrnium olusatrum*) and divided between himself, Mr Niblett and myself, over 90% of the specimens bred by each of us were the light body-coloured form *onopordinis*, Fab., and only 10% the dark form *centaureae*, Fab. Mr Niblett had a similar result in a smaller series of the same species bred from hogweed (*Heracleum sphondylium*), but these results need to be checked by many more breeding experiments before drawing definite conclusions.

Finally I have to thank Messrs Audcent, Collin, Hamm, Niblett and Saunt for much helpful criticism, and to Mr T. D. Fuller, who drew for me the diagram.

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### A STUDY ON THE CIRCULAR MOUNDS OF THE ANT *CATAGLYPHIS BICOLOR*, F. (HYMENOPTERA FORMICIDAE).

By W. PICKLES, F.R.E.S.

Plate VIII.

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Forel (1928) mentions that ants which are not afraid of their nests being discovered make dumps of their excavated materials around the nest-mouths. Some of these which are circular and of regular shape he terms "ramparts."

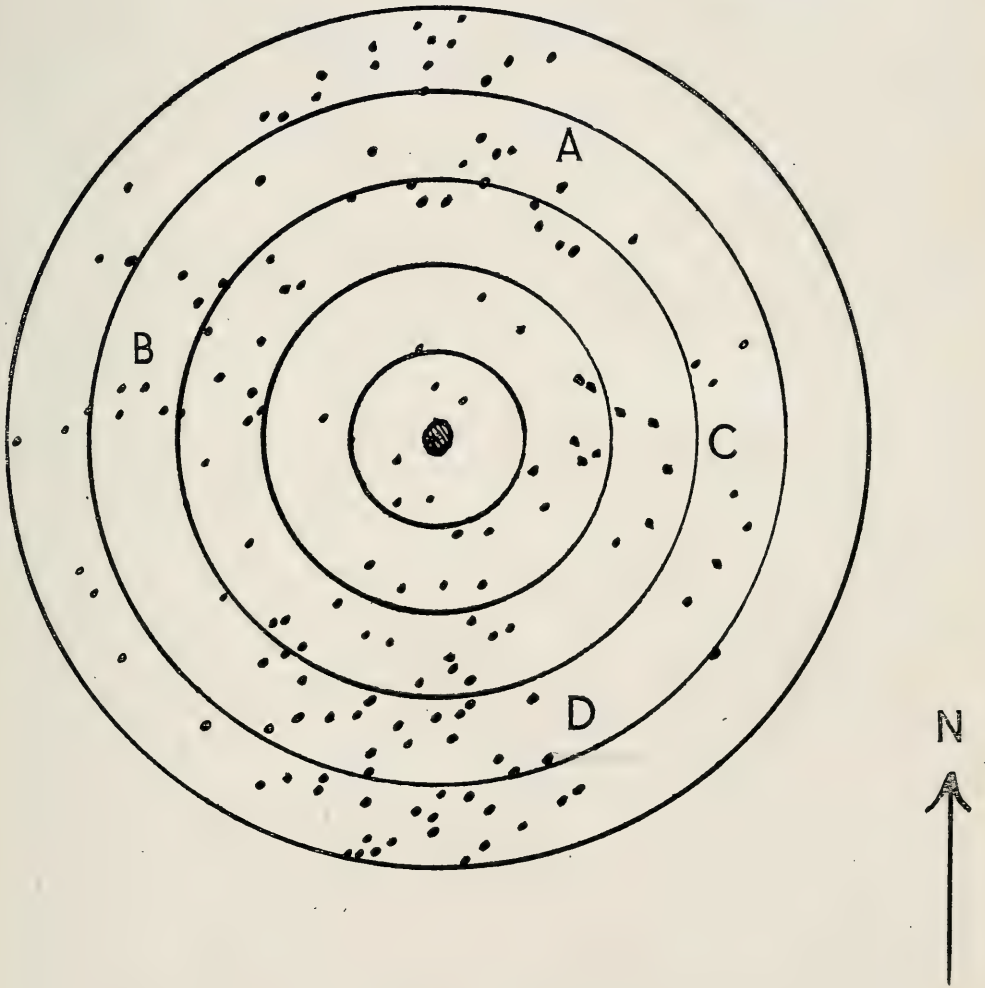
The ant *Cataglyphis bicolor*, F., is one of these species making a "rampart" and as these are so regular in height and circumference, being practically circular, it was decided to make observations on the method employed by this species to attain this regularity.

The nest was on a piece of waste ground near Athens (Greece), but unfortunately after only a comparatively few observations had been made the project had to be abandoned due to circumstances beyond my control and they could not be resumed later due to my return to England.

However, for what they are worth, it was decided to place the data on record as a few points of interest had made themselves manifest.

The method employed to ascertain how the "ramparts" were built was to observe the ants as they emerged from the mouth of the nest, and note the part of the "rampart" to which they went to dump their particles of soil. This was recorded on a card upon which half-inch circles had previously been drawn, the outer circle of which was the same size as the outer rim of the "rampart." This card was orientated to the nest and the places marked on the card to which the ants took the particles of soil on the "rampart." In this way a record was obtained and after a little practice these charts could be done with a reasonable degree of accuracy. Many of these charts were made and a typical one is reproduced in the accompanying figure. This figure represents the points where soil was deposited over an interval of five minutes. The result of a perusal of all these charts was that the ants do not deposit their soil evenly all over the "rampart" but during given periods of time certain regions receive more soil than others, i.e., in the figure the areas A, B, C and D received heavier deposits than the rest of the "rampart." During other intervals of time the areas not





Plan of a circular Ant Mound.





built up at one time will get their share of soil so that the "rampart" is of roughly the same height all round.

THE RATE AT WHICH THE SOIL IS BROUGHT UP FROM THE NEST.

It was thought that a record of the rate at which these ants brought up the soil while excavating would be of interest and so the following records were made. Unfortunately, and for the same reasons as given above, they were interrupted and only a few made. These are given in the accompanying table.

THE RATE AT WHICH THE ANT, C. BICOLOR, BRINGS UP THE PARTICLES OF SOIL.

Date.	No. of ants emerging from nest.	Interval of time in minutes.	Rate of emergence per minute.
13.x.45	49	5	10
	14	5	3
	14	5	3
	139	5	28
	154	5	31
	194	5	39
	260	5	52
	201	5	40
14.x.45	52	1	52
	46	1	46
	44	1	44
	44	1	44
	44	1	44
	46	1	46
	34	1	34
	48	1	48
	46	1	46
	46	1	46
16.x.45	42	1	42
	51	1	51
20.x.45	12	1	12
	10	1	10
	11	1	11
	7	1	7
	12	1	12
	10	1	10
	12	1	12
	13	1	13
	11	1	11
	10	1	10
22.x.45	11	1	11
	12	1	12
	14	1	14
	15	1	15
	19	1	19
	17	1	17
	15	1	15
	17	1	17
	14	1	14
	13	1	13

There appears to be a relation between the speed of excavation and the weather on any particular day—on 13th, 14th and 16th October the weather was fine, warm and sunny following showers, and on 20th and 22nd October, the days were over-cast and the effects of the showers had begun to wear off. It was noticed that this decrease in activity was evident at other nests in the locality on these days also.

Another point with regard to the excavation of these nests and the building of the "ramparts" is that the ants do not emerge at regular intervals with their loads. There may be a lapse of several seconds without any ants appearing and then several will come out at the same time. This will be followed by another gap and then several more will appear together.

From this short and interrupted survey, it would appear that the "ramparts" are built unevenly, one section during a given interval of time receiving more soil than the rest, and also that these ants excavate at a quick rate which appears (at least so far as could be ascertained during these observations) to depend upon the weather.

I wish to thank Mr H. St. J. K. Donisthorpe for kindly naming the ants for me.

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#### REFERENCE.

1928. Forel, A. "The Social World of the Ants," Vol. I, London.

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### EARLY STAGES OF ORIENTAL PALAEARCTIC LEPIDOPTERA, VIII.<sup>1</sup>

By E. P. WILTSHIRE, F.R.E.S.

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*Argynnis (Brenthis) hecate*, Schiff., ssp. *caucasica*, Stgr.

Larva: Dorsally black, ventrally yellow-brown, with typical Argynnid spines and two yellow dorsal lines. Spines, yellow-brown. Sublateral line, white, zigzag, conspicuous. Head, brown. Spiracles, small and black.

Foodplant: *Rubus*. (This does not confirm speculation in Seitz.)

Pupa: Rosy brown, shaded with grey on abdomen and wings. Subdorsal spines, dazzlingly silver-gold, especially on somites 4 and 5. The prominent spine on somite 6 and the others on 7-10 are less gilt than the thoracic. From a larva which hung up to pupate on 29.V the imago hatched 9.VI. The imago was also taken on the wing at the same time as this particular larva, i.e. 28.V. This was at 6000-7000 ft. on the south side of the Elburz.

In Northern Kurdistan the imago flies at 6000 ft. in VII.

From the evidence no conclusion can be reached as to number of broods in Middle East.

*Melitaea trivia*, Schiff., ssp. *robertsi*, Butl.

This species has already been described in its early stages and the object here is to draw attention to local variation in the larva and pupa.

Larva: (1) Beirut, Lebanon form: blue-grey, with dark dorsal chain; spines, yellowish with white tips. Head, orange, divided by a black line and marked with a dot low down on each cheek. Legs, black; abdominal claspers, yellowish (sea-level).

<sup>1</sup>The previous article in this series appeared in *Ent. Rec.*, LVI, November 1944.



(2) Elburz, N. Persian form: black, with yellow-brown feet, spines and head, the latter marked with black (9000 ft.).

(3) Shiraz, S.W. Persian form: blackish ground colour under lens proves to be sooty grey with black rings; spines yellow. Head, orange-brown, blackish between the lobes (7000 ft.).

Foodplants: (1 and 2) *Verbascum*, (3) *Scrophularia*.

Pupa: (1) Blue-grey, with black and orange blots representing the setae, in the form of a not very concave "C" with an orange centre.

(2) Whitish grey, heavily dappled with black on thorax and wing-cases, but so as to leave a pale dorsal line; abdomen, as in (1) (Plate III, fig. m.).

The discoidal inferior hindwing nervure, among other characters, has served to confirm the identity of the imagines hatched from the above larvae and pupae.

*Melitaea persea*, Koll.

A pupa of this common Persian species was found on a rock at 6000-7000 ft. near Shiraz. It was white, with black and orange markings reduced to a minimum, i.e. a long wavy orange streak and four small black dashes on each wing-case; intensest black markings on proboscis-case, between the wings; fine black dots on eyes and seta-points, sometimes accompanied by orange shades.

*Procris brandti*, Alberti.

Larva (Plate III, fig. j): Small, blackish dorsally, with warts giving rise to star-like clusters of white and grey-brown hairs, the white tufts forming two white subdorsal lines. Sides and underside, grey-brown. Head and thoracic feet, black; claspers, brown.

Foodplants: *Prunus* and *Amygdalus*. Habitat, S. Zagros scrub woods (3000-8000 ft.). Larva matures in IV or V, according to elevation, and can even be found in III at lower middle heights. Pupal period is short, and the imago flies in early summer.

*Trichiura sapor*, Wilts.

Described in the foregoing article, "Middle East Lepidoptera, New Forms and Species, IV."

Larva: Rather variable. Ground-colour, whitish or bluish-grey. When immature (see Fig. k, Plate III), white upstanding hairs form two white dorsal chains, the links consisting of one white longitudinal streak per somite. Sometimes this is so in the last instar too, but more usually the white dorsal markings are then more extensive. The subdorsal line is then wavy, white, with an interrupted black upper and lower edging, the latter the heavier, and a pink spot at each somital joint. On each of the abdominal somites there are black dorsal markings consisting of three parallel lines posteriorly and a thicker [1 or =1] anteriorly (head to left). The three lines are wider than the "C1." On somites 1 and 2, however, there are only broad transverse black bands, with forward-pointing white tufts, and somite 3 has no black dorsal marking. Lateral markings: a conspicuous black or orange-brown spot above the smaller black spiracle, this spot being black in the white-grey forms; also, fainter black vertical streaks near the somital joints. Somite 11 is dorsally almost entirely black. Feet, pink grey. Underside, pale orange and green, with a series of large dark

grey ventral spots. Sometimes, in the blue-grey forms, the posterior half of each somite is yellow-infused. In the blue-grey forms a crimson dorsal bar on somite 11 and two crimson dots on somite 12 appear just above the orifice. In this form the black dorsal markings on the abdominal somites is less extensive, the first of the three bars being no wider than the "C1," and all three being narrower than in the grey form.

The holo-type of *sapor*, emerged from a white-grey form (Plate III, fig. 1); but I do not think the blue-grey form is a different species.

Habit, rather sluggish; numerous larvae are found together on a single bush, especially when half-grown in early spring (early III at 3000 ft.). These were full grown by early IV.

Foodplant, *Amygdalus spartioides*. They refused garden almond and apricot, hence the mortality. Habitat: S. Zagros scrub-woods.

Pupa, heavily chitined; ♀ anus without hooks, blunt.

Cocoon, brown, brittle, in a crevice on ground, rough-hewn, long-oval. Would be impossible to distinguish from mud or a pebble in a natural state.

After a long pupal diapause the imago emerges about mid XI.

*Chondrostega aurivillii*, Pungl. ssp. *feisali*, Wilts.

Larva: Dark grey, dappled with black, this being, however, only apparent in the somital joints. Elsewhere, long yellow and red hairs, springing both from pale brown warts and from the skin, conceal the latter. Shorter black hairs also arise from the warts, but these are not seen with a superficial look. Head, black with an orange or pale brown horizontal bar above the mouth. Spiracles, black. Feet, brown, claspers, orange-brown, both marked with black.

When alarmed, the larva rolls up and then presents a "catherine-wheel" aspect (see fig. O, Plate III); the larva's usual defence, however, would seem to be running. It is a swift runner, and the large gaily-coloured larvae are a common sight on hot days in March in the desert (Lat. 33° N., alt. c. 250 ft.). When smaller, during the cooler winter months, they are more sluggish. They are a favourite prey for bustard, plover and other birds. In S. Persia (Fars) they are called "New Year's Day Pussies" (Gurbeh-i-No-Rooz), this day being 21st March. At sea-level south of lat. 30° the larvae have all buried before the end of February, and the moth appears a week or so later in October. In Iraq the moth hatches after a long pupal diapause in late September or early October. The flight is of short duration, emergences not being "spread."

Cocoon: Whitish, unless (as is the case when wild) woven with earth. Oval, like a *Lasiocampa* cocoon.

Emergence of imago takes place in the afternoon. The wingless females have a strong bitter odour. The males come to light freely.

Foodplant: Low desert annuals. Habitat: Desert and steppe of various types, except alluvial (mud) desert.

*Acronycta tehrana*, Wilts. (Plate III, fig. n).

The relation of this form to *psi* and *solimana* is discussed in the original description, in the foregoing article "Middle East Lepidoptera, New Forms and Species, IV."



**Larva:** The wide, light blue dorsal area is interrupted on somite 4 by a black fleshy process and is edged by two black subdorsal spots per somite on each side; from these spots spring long black hairs. Below them is a red lateral area, bounded below and interrupted at each somital joint by the blue ground-colour. Spiracles, black. Underside, feet and claspers, lilac-grey. Head, glossy black.

**Foodplant** (presumed: larva was found on it, but spun up without eating): *Ulmus*.

**Pupation:** Early VI.39, emergence 8.V.40.

*Amathes (Rhyacia) pulverea*, Hamps.

I obtained many larvae of the *xanthographa* group at Kermanshah (W. Persia) in spring 1940, and noted down three or four different forms and segregated them. Unfortunately, I had to travel to Shiraz via Tehran just at pupation-time, and the resulting mortality prevents me from giving descriptions of the larval differences of the three† species of this group which occur in the Middle East. Only one pupa produced an adult, a ♀ *pulverea*. The larva from which it hatched was described as follows:—

Typical brownish *Rhyacia* larva; dorsal line, fine, pure white, interrupted but visible throughout its length; typical black subdorsal dashes only strongly marked on somites 9 and 10. There is a mottled tendency, possibly in some individuals only, and a tendency to a dorsal diamond formation. Spiracles, white, finely black-rimmed, accompanied by a series of slight dark smears.

**Foodplants:** Low plants and grasses, at night. The larva buries at the end of March; the moth flies in autumn. (5000 ft.)

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CORRIGENDUM TO PART V OF THIS SERIES.

The larva described and figured in Wiltshire (April 1943) as *Clytie distincta* ssp. *iranica*, Brandt, was not that species but a third larval form of *Hypoglaucitis benenotata*, Warr., of which two larval forms were described in Part III (*Ent. Rec.*, November 1944). The name should therefore be amended therein, and in Wiltshire (October 1944) name No. 344b (in the Addendum) should be deleted, since this referred to the same larval form.

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NEW RECORDS OF LEPIDOPTERA FROM IRAN—II.

By E. P. WILTSHIRE, F.R.E.S.

My first article in this series added seventy species of Lepidoptera to the already recorded fauna of Iran (Persia). This is intended as a further contribution to a faunal list of that faunistically amazing land.

As the result of further studies of my 1939-42 material the following new records can be added:

†The occurrence of the third, *palaestinensis*, Kalchb., in Persia, still requires confirmation.

## AGROTIDAE.

*Bryophila strigula*, Borkh.

Seven specimens; throughout viii; Gulhek, Tehran (5000 ft.) Oasis. Identity confirmed by comparison of genitalia with plate in Boursin, XXIX.

*Acronycta pasiphaë*, Draudt.

Fars:—15.vii, Shiraz, 5500 ft.; Muk Pass, 15.vi, 6000 ft. Habitat: scrubby or deforested limestone hills.

*Acronycta aceris*, L., subsp. *johanna*, Schaw.

Tehran (Derband), 18.vi, 6000 ft. Oasis. This is the same form that occurs in Bagdad and appeared as No. 258 in my list of Iraq Lepidoptera (1944, October). Schawerda described a Mosul specimen as a new species near *psi* (!), according to Boursin. It is merely a race of the well-known British species, as its genitalia and larva show. In the Middle East the latter feeds on poplar, and the moth is confined to oasis biotopes.

*Amathes (Rhyacia) pulvereae*, Hamps.

Kermanshah, Pireh-Zan, Shiraz, all Zagros localities; but since the species is known from Central Asia it is doubtless not confined to the plateau's western rim. None of my specimens is var. *elutior*, Alph. (See Boursin XXV for the nomenclature and taxonomy of the three members of the *xanthographa* group.) Definitely the commonest of the group in Persia. [No. 25 in the previous article (*palaestinensis*, Kalchb.) should be deleted; err. det. for *pulvereae*.]

*Palluperina dumerili*, Dup., ssp. *aequalis*, Schaw.

Khan-i-Zinian, Fars, 20.x.40, c. 6000 ft. Scrubby hillside. (Genitalia examined.)

*Stenodrina aeschista*, Bours.

Tehran, 5.ix, 14.ix. Gardens. (Genitalia examined.)

With reference to the previous list of seventy species, further study enables the following comments, in some cases confirmatory, in others by way of correction.

Delenda: No. 1 (as per corrigendum in same volume) and No. 25 (see above). No. 36 (subsp. of *australis*) should read *Aporophyla scriptura*, Freyer, bona species. This is the same species as *ingenua*, Freyer, and the form *dipsalea*, Wilts. (December 1941) belongs here, not to *nigra*. Nos. 48 (*algae*), 64 and 65 (*fuscantaria* and *erosaria*): these three records must be withdrawn pending a fuller report which will appear in the next article in my "New forms and species" series.

Confirmanda: No. 10 (*siva*). Occurrence at Bushire rests on a female taken there, not merely on larvae observed there.

No. 24 (*xanthographa*). Occurs at Kermanshah, and in Fars (Shapur, 3000 ft., near Kazeroon). (Genitalia examined.) This seems to be the most easterly and most southerly record of this species.

No. 39 (*protea incolorata*) and No. 41 (*ocellaris*). (Genitalia examined.)

The following may be added to the list of works giving records of Lepidoptera from Iran:—



- Alberti, Dr B. (1939): Neue Procris-arten aus Iran (*Ent. Rundsch.*, **56**, p. 1, p. 28).
- (1940): Hesperiden Studien—IV (*Mitt. Muench. Ent. Ges.*, **XXX**, Heft 1, p. 235).
- Boursin, Charles (1942): XXXI (*Zeits. d. Wiener Ent.-Ver.*, 27 Jahrg., pp. 89-101).
- (1943): XXXII (*Id.*, 28 Jahrg., pp. 314-316).
- Brandt, Willh. (1941): Beitrag zur Lepidopteren-Fauna von Iran (3 and 4) (*Mitt. Muench. Ent. Ges.*, e, V, XXXI Jahrg., Heft III).
- Lecerf, F., 1937: Aegeriidae nouvelles ou peu connues d'Asie anterieure (*Zeit. d. Oest. Ent. Ver.*, **22**).
- Reiss, H., 1938: Neues ueber die Zygaenen-fauna des Elburs Gebirges und ihr Beziehungen zu den Faunen Nordafrikas und der Pyrenaen-Halbinsel. Nachtrag (*Ent. Rundsch.*, **55**, p. 40).
- Reisser, Hans (1939): Beitrage zur Kenntnis der Sterrhinae (Lep. Geom.), I (*Zeit. d. Oest. Ent. Verein.*, **24**, p. 26).
- Schwingenschuss, Leo (1937): Weitere Neuheiten aus Nordpersien (*Id.*, **22**, p. 57).
- Wagner, Fritz (1936): Zwei neue Noctuiden aus Nordpersien (*Id.*, **21**, p. 73).
- (1937): Drei weitere neuheiten aus Nordpersien (*Id.*, **22**, p. 21).
- (1937): Einige weitere Neuheiten aus Nordpersien (*Id.*, **22**, p. 5).
- Zerny, H. (1939-40): Mikrolepidopteren aus dem Elburs-Gebirge in Nord-Iran (*Id.*, **24**, p. 128; **25**, p. 48).

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ERRATUM TO "KEY TO PLATES I, II AND III."

Plate I, line 1: for " (X65) " read " (X82)."

Plate III, Fig. c: for " *consulis*, V.W." read " *phoebe*, W.V."

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REFERENCES.

The following are the references made in the above short article and also in the two foregoing articles:—"Middle East Lepidoptera, New Forms and Species. IV" and "Early Stages of Oriental Palearctic Lepidoptera. VIII" (*Ent. Rec.*, Vol. LVIII, 1946).

- Boursin, Charles (1940): XXVth Contribution a l'étude des Agrotidae Trifinae (*Rev. Franc. d'Ent.*, VII, pp. 86-93, Plates III, IV).
- (1940): XXIX (*Soc. Linn. de Lyon*, 9, 7-10).
- Daniel, F. (1932 and 1939): *Mitt. Muench. Ent. Ges.*, XXII, Heft 2, p. 81, and XXIX, Heft 1, p. 97.
- Higgins, L. G. (1941): An Illustrated Catalogue of the Palaearctic Melitaea (*Trans. R. Ent. Soc. London*, 91).
- Draudt (1938): *Mitt. Muench. Ent. Ges.*, XXVIII, Heft 1, p. 29.
- Schawerda (1940): *Int. Ent. Zeits.*, 15, p. 113.
- Wiltshire, E. P. (1940): The Lepidoptera of the Lebanon, Addendum (*Proc. R. Ent. Soc. London*, Series B, Vol. 9, Part 5).
- (August 1941): New Lepidoptera from S.W. Iran (*Journ. Bombay Nat. Hist. Soc.*, XLII, No. 3).
- (December 1941): Mesopotamian Desert Lepidoptera (*Id.*, XLII, No. 4).
- (April 1943): Early Stages of Oriental Palaearctic Lepidoptera. V (*Journ. Bombay N.H.S.*, XLIII, Part 4).
- (December 1943): Some More New Lepidoptera from S.W. Iran with their Life-Histories (*Id.*, XLIV, No. 2).
- (October 1944): The Butterflies and Moths of Iraq (Directorate-General of Agriculture, Bagdad, *Bulletin* 30).
- (1945): Seventy New Records of Lepidoptera from Iran (*Ent. Rec.*, LVII, July).

## COLLECTING NOTES.

FLABELLIFERA [=CTENOPHORA] FLAVEOLATA, FAB., IN ESSEX.—Mr C. Bignell Pratt sent me recently a female of this handsome large yellow winged Crane-fly with its black and yellow ringed abdomen, a mimic of *Sphecidae*. Mr Pratt has kindly allowed me to keep the specimen which was taken by Mr W. J. Byford during a Field Meeting of the Essex Field Club at Gt. Monk's Wood, Epping Forest, on 27th April.

Audcent (1932) in "British Tipulinae (Diptera, Tipulidae)." *Trans. Ent. Soc. South Eng.*, vol. 8, records it only from Hants., Oxon., Wilts. and Yorks. Doubtless it has been a resident of Epping Forest for a long time. Its presence in the London Area may be known to other entomologists and I should be grateful for notes on its distribution and, in fact, of any other *Tipulidae* known in the London Area (20 miles around St Paul's).—L. PARMENTER, F.R.E.S., 94 Fairlands Avenue, Thornton Heath, Surrey.

"CANNIBALS."—I hope Mr Wightman's interesting note in the April issue (page 54) will initiate a discussion of this matter. I too read the passage of *C. trapezina* "in a recent publication on 'Moths'"—(the litotes was really unnecessary: I have long since given up blushing)—and thought it mildly amusing; which shows how dangerous it is for a writer on lepidopterology to have a sense of humour. But my experience (perhaps no less in extent than that of Mr Wightman) does not altogether tally with his; for I have found that so far from attacking each other "unless the victim is injured by the beating stick" these larvae pay no heed to an injured brother or any other injured relation. Which indeed is what the student of bionomics would expect; for an injured larva is an abnormality on a tree, and larvae of various species are a natural food of *C. trapezina* in its last two instars (but principally in the last one). The ecological norm plays its part here, and what a larva will do in captivity is no criterion of its behaviour in the wild.

I have not found that the size of a glass-bottomed box materially affects *C. trapezina*'s appetite; one could carry twenty larvae of this species in a 2-inch box all day and still find twenty larvae there on reaching home—provided the larvae were in their early instars. As with us, a larva's appetite depends on the degree of vacuity of the stomach—which shows that we and caterpillars have advanced further along the evolutionary road than trout, which will rise at a fly when gorged (see my *Trout Heresy*, 1936, p. 19), and doubtless several replete *C. trapezina*, even in their last instar, would display nothing but bonhomie if confined for a couple of hours in quite a small box.

—But only 82 per cent., and that only "in one year"! What happened to the balance? And "rarely less than 60 per cent.," so presumably there were actually occasions when the percentage of survivals was only in the fifties. Which looks remarkably as though it were a fifty-fifty affair—50 strong and 50 weak, the weak ones going into the stomachs of the strong. *Fortes infirmæ juvant* . . .

*E. transversa* (*satellitica*) is highly light-sensitive and I have not yet succeeded, wholly successfully, in observing the actions of this larva when on the prowl—which is invariably late at night. Nor have I ever met or heard of anyone who has actually seen the species attack



another larva. But that its habits are cannibalistic has been asserted by both Continental and British observers, and like Buckler I have found, on several occasions, that larvae of non-cannibal species confined with *E. transversa* (in its last instar), and in a  $18 \times 9 \times 10$  cage, do disappear.

I can bear out Mr Wightman's suggestion that lack of moisture is at the base of most cannibalism; in fact, I hold so firmly to this belief that for many years I have advocated spraying the foodplant of a great many species. Never, in my cages—and I rear the species every year—has the Sprawler eaten meat, nor have *X. ornitopus* nor *X. socia*, both reputed cannibals. But I found last year that by rearing *Euphydryas aurinia* in very dry surroundings some of the larvae fed with gusto on their newly-pupated brethren.

Of *D. oo* I have no experience; but from what I know (which is very little) of the bionomics of lepidopterous larvae no self-respecting caterpillar would relish anybody opening its "feeding-tent" and pushing in "tempting-looking oak feeding Geos." The ecological norm has much to answer for. And perhaps the Geos. looked tempting only to the observer: the *D. oo*'s may have hated the sight of them. It is extremely difficult to tell what is passing in a caterpillar's mind.—P. B. M. ALLAN.

FOOD-PLANTS.—With reference to Mr Allan's note (1946, *Entomologist's Record*, 58: 40) on the larvae of *Euproctis similis*, Fues., feeding on grass and herbaceous plants instead of on their usual food-plants of deciduous trees and shrubs, I can record similar cases with three Indian species of *Lymantriidae*. I have found the larvae of *Dasychira mendosa*, Hbn., on Castor and Sunflower, of *Porthesia (Euproctis) scintillans*, Wlk., on Castor, Sunflower and Orange Cosmos, and of *Lymantria ampla*, Wlk., on Castor and Palms. Castor may be considered a border line case between herbaceous and deciduous plants. Maxwell-Lefroy, in *Indian Insect Life*, records *D. mendosa* feeding on Potato and *P. scintillans* on Linseed and Bajra, a species of Millet.

I have found larvae of *Parasa lepida*, Cr. (*Limacodidae*) on Palms, and those of *Eupterote undata*, Cr. (*Eupterotidae*) on Palms and on a coarse ornamental grass, both these species normally feeding on deciduous shrubs and trees. I have also found larvae of *Cretonotus transiens*, Wlk. (*Arctiidae*), which normally feed on *Compositae* and other low plants, feeding on grass. The food-plants of *Utetheisa pulchella*, L., are given as *Myosotis* and grasses in Hampson's *Catalogue of the Lepidoptera Phalaenae*.—D. G. SEVASTOPULO, F.R.E.S., Calcutta, 24.iv.46.

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### CURRENT NOTES.

---

WE offer our earnest sympathy to our old and well-loved entomological friend, S. G. Castle Russell, on the passing of Mrs Russell on 17th March at the age of 85. For some 46 years Mrs Russell had been the faithful and beloved companion who had almost invariably accompanied her husband on his entomological expeditions. Becoming interested and col-

lecting energetically herself, she got to know other entomologists, who as visitors were always received by a thoughtful and kindly hostess.

THE Annual Exhibition of the Amateur Entomological Society was held at the Buckingham Gate, L.C.C. School, on 12th March, and as usual was very well attended. There was a large exhibit of entomological apparatus, much of it home made and improvised from all kinds of material that was ready to hand, especially for breeding purposes. Demonstrations of setting Lepidoptera and of Coleoptera were given by Messrs Classey and Cooper respectively. Among the large number of exhibits was a good sprinkling of the migrant species and a few unusual varieties. The photographic section was very good and some paintings of insects were quite attractive. There were a few life-histories of which *Glyphipterix fischeriella*, Zell., may be mentioned. Great praise is due for the successful show, to the officers of the Society and especially to the Secretary, B. A. Cooper, and to E. W. Classey.

THE London Natural History Society is compiling records in all Orders of insects for the Society's area—within a radius of 20 miles from St Paul's Cathedral, including the whole of Middlesex—with a view to publication. This faunistic survey is intended to consider both historical and ecological aspects, and we hope that all London entomologists will be interested to hear of the scheme and to participate in it. A Recording Secretary has been appointed, who will keep the files and distribute the data to the specialists in the different Orders who have undertaken compilation. Please send all correspondence to:—Mr P. W. E. Currie, 102 Burdon Lane, Belmont, Sutton, Surrey. The Odonata and Rhopalocera are the Orders to be dealt with first. Shall we get the prior spelling of the prior names? The present lists in use are full of the mauling of the definite prior names.

THE usual Annual Report of the Entomological Society of Ontario (the 71st) has just come in. It consists of 64 pp. of the routine business matters of the Society, and the fourteen papers presented to the Annual Meeting. All these deal with economic entomological matters under the auspices of the Ontario Department of Agriculture.

IN our review of the *Hymenoptera Handbook* in a recent issue we should have noted that it could be obtained with other Amateur Society publications as well as data labels from C. D. Pratt, 1 West Ham Lane, London, E.15.

THE South London Entomological Society has issued its Programme for 1946. The Officers are to be highly commended for the plans they have so far arranged for the period to the end of October. In spite of the adverse conditions of having no permanent abode they are carrying on a series of meetings indoors and outdoors in quite the old way they have been in the habit of acting for the last half century. Field meetings sometimes three per month, two indoor meetings per month as of old. May the meetings under the present strain be as pleasant as I remember them in the time of Tutt, Barrett, South, Step, Gibbs, Jenner Weir, R. Adkin and others who long have passed on.



## EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge.

They should be sent to Mr H. J. TURNER, "Latemar," West Drive, Cheam.

**Wanted**—American Hesperidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.

**Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.

**Wanted**.—*Lycaena* (*Heodes*) *phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. **Duplicates**.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.

**Wanted** for cash or exchange many species of ova, larvae or pupae, especially local forms and *A. grossulariata* from different localities, also Seitz Vol. 1 and Supplements to Vols. 1-4. Offers also, Tutt's *Practical Hints*, Parts 1 and 2, Buckler's larvae, Vols. 1-6, and Tutt's *British Noctua*, Vols. 2, 3, and 4.—Dr J. N. Pickard, F.R.S.E., 36 Storeys Way, Cambridge.

**Wanted**.—Various monthly parts of *Entomologist's Record* for 1914, 1915, 1916, 1917, 1919, and 1920. Please report any odd monthly parts (in wrappers as issued) prior to these years.—P. B. M. Allan, 4 Windhill, Bishop's Stortford, Herts.

**Wanted**.—Males of *Morpha menelaus*, *M. didius*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.

**Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephantor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.

**Wanted** for purchase or exchange, pupae of *Smerinthus ocellatus*.—E. S. A. Baynes, F.R.E.S., Monkshatch Cottage, Compton Guildford.

**Wanted**.—The two volumes (bound or in parts) of the second "Deuxieme Partie Geometres only of Culet's Noctuae et Geometres d'Europe."—Brig.-Genl. B. H. Cooke, C.M.G., C.B.E., D.S.O., F.R.E.S., 86 Osborne Road, Windsor.

**Desiderata**.—No. 8 Black Pins for Cash or Exchange.—A. J. Wightman, "Aurago," Pulborough, Sussex.

**Wanted**, set or in papers, perfect specimens of *Lycaena arion*, *L. corydon*—vars. *syngrapha* and *semi-syngrapha*, *Thecla betulae*, *T. w-album*, *Nemeobius lucina*, *Vanessa polychloros*, and *Papilio machaon*, in exchange for British, Indian, Australian, African and American Rhopalocera, in papers.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.

**Wanted**, British butterflies, set or in papers, in exchange for *Morpho papirius*, *Morpho didama*, and other Morphos.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.

**Exchange**.—I would like to get in touch with those interested in exchanging living ova and larvae of southern species of Lepidoptera for northern species and adults. Write stating wants and probable offers.—J. K. Goody, Weldon, 26 Carr Wood Road, Bramhall, Cheshire.

**Books Wanted**.—Burr, M.—1936—British Grasshoppers and their Allies. Chopard, L.—1922—Orthoptères et Dermaptères. Fowler, W. E.—1887-91—Coleoptera of the British Isles, either of Vols. I-IV Col. pls. For Sale—Saunders, E.—1892—Hemiptera-Heteroptera of the British Islands (without plates), £1.—H. G. Stokes, 12 Roman Road, Salisbury, Wilts.

**Wanted**.—*Entomologist's Record*, 1911-37, bound or unbound. Offered:—Various volumes of *The Entomologist*.—B. O. C. Gardiner, "The Red House," River-in-Dover, Kent.

**Wanted**.—Information re literature on West African Lepidoptera.—Surgeon Lt. H. M. Darlow, R.N., F.R.E.S., Corr House, Glebe Road, Bedford.

## MEETINGS OF SOCIETIES.

*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: October 2nd and 16th; at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1: Meeting for June 26th is cancelled: July 10th and 24th meeting at Linnean Society's Rooms, Burlington House. Subsequent meetings as usual at Royal Society's Rooms; 6.0 for 6.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppell Street, Gower Street, W.C.1: Sectional Meetings on first Tuesday and General Meetings on third Tuesday of each month, 6.30 p.m. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

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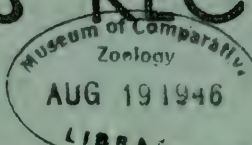
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JULY-AUG. 1946

# ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION



EDITED with the assistance of

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**FORMICIDAE, STEPHENS (1829).**

By H. DONISTHORPE, F.Z.S., F.R.E.S., etc.

Some authorities consider that a Family name has no author, nor is there any priority attached to the same. Others, on the other hand, think otherwise, including a number of Myrmecologists. It seems to me that someone, sometime, must have first used the name now in use; therefore I have endeavoured to settle this matter for the Family *Formicidae*, or ants. I append the names given, or used, by various authors:—

- Latreille, 1802. "Familia prima. Les Fourmis arquées. *Formicae arcuatae*."
- Latreille, 1805. "Famille soixante-sixième. Formicairies; *formicariae*."
- Latreille, 1810. "Famille ix. Formicairies, *Formicariae*."
- Leach, 1815. "*Formicarides*."
- Leach, 1817. "*Formicadae*," teste Schröder.
- Stephens, 1829. "Familia *Formicidae*, Leach (*Formicariae*, Latreille)."
- Shuckard, 1840. "*Formicidae*, Leach."
- Westwood, 1840. "*Formicidae*, Leach."
- F. Smith, 1851. "*Formicidae*, Leach."
- Dalla Torre, 1893. "xiii Fam. *Formicidae*, Latreille."
- Wheeler, W. M., 1920. "Latreille as early as 1810 used 'Formicarii' as a family name, and it would seem permissible to cite him as the author of *Formicidae*."
- Schröder, 1924. "Familia: *Formicidae*, Stephens (*Ameisen*). He also gives "*Formicariae*, Latr., 1802, *Formicarides*, Leach, 1815, *Formicadae*, Leach, 1815, *Formicidae*, Steph., 1829."

I have been unable to check Leach's *Formicadae*, 1817, but Latreille used *Formicae*, not *Formicariae*, in 1802; and, in 1810, *Formicariae*, not "Formicarii."

It would be permissible, of course, to substitute *Formicidae* for any of Latreille's, or Leach's, names; but as Stephens, apparently, actually first used the name *Formicidae*, and this long before the rule was passed by the International Commission that "idae" must be the suffix to family names, he should be credited as the author of *Formicidae*.

## LITERATURE.

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- Latreille, P. A. "Hist. Nat. des Fourmis," Paris, *An.*, x, 1802, p. 88.
- "Hist. Nat. Générale et Particulière des Crustacées et des Insectes," *An.*, xiii, 1805, Vol. 13, p. 241.
- "Considérations Générales sur L'Ordre Naturel des Animaux," Paris, 1810, p. 311.
- Leach, W. E. "Entomology" in Brewster's Edinburgh Encyclopaedia, 1815, 237-42.
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- Shuckard, W. E. "Monograph of the Dorylidae, a family of Hymenoptera-Heterogyna," *Ann. Nat. Hist.*, 1840, Vol. 5, pp. 188-231.

- Smith, F. "List of the Animals in the Collection of the British Museum, Hymenoptera Aculeata," 1851, Vol. 6, p. 1.  
 Stephens, J. F. "A Systematic Catalogue of British Insects," 1829, p. 357.  
 Westwood, J. O. "Introduction to the Modern Classification of Insects," 1840, Vol. 2. Synopsis, p. 83.  
 Wheeler, W. M. "The Subfamilies of *Formicidae* and other Taxonomic Notes," *Psyche*, 1920, Vol. 27, p. 52.

#### SOLENOPSIS, WESTWOOD, 1840.

The date of this genus is 1840, although Dalla Torre, 1893, Bingham, 1903, Wheeler, 1911, Donisthorpe, 1915, and Emery, 1922, all give 1841. On the title page and also on the back of the cover of Vol. 6 of the *Annals and Magazine of Natural History* the date is given as 1841. It is not, however, until page 321 that the first number for 1841, January, occurs. The description of *Solonopsis* is on page 86, consequently the date is 1840.

#### LASIUS, FABRICIUS, 1805.

The date of *Lasius*, F. (nec Jurine), is 1801, although Dalla Torre, 1893, Bingham, 1903, Wheeler, 1911, Donisthorpe, 1915, and Emery, 1925, all give 1804. Griffin has shown that the date of Fabricius's *Systema Piezatorum* is 1805, *Trans. R. Ent. Soc. Lond.*, 1935, p. 144.

#### FORMICIDAE, Stephens. 1829.

##### Heterogyna.

##### Ponerinae, Lepeletier. 1836.

##### Ponerini, Forel. 1893.

#### PONERA, Latreille. 1804.

##### COARCTATA, Latreille. 1801.

##### (contracta, Latreille. 1802.)

##### PUNCTATISSIMA, Roger. 1859.

#### Myrmicinae, Lepeletier. 1836.

##### Myrmicini, F. Smith. 1858.

#### MYRMICA, Latreille. 1804.

##### LAEVINODIS, Nylander. 1846.

##### var. ruginodo-laevinodis,

##### Forel. 1874.

##### RUBRA, Linnaeus. 1758.

##### (ruginodis, Nylander. 1846.)

##### var. sulcinodo-ruginodis,

##### Emery & Forel. 1879.

##### SULCINODIS, Nylander. 1846.

##### SCABRINODIS, Nylander. 1846.

##### SABULETI, Meinert. 1861.

##### LOBICORNIS, Nylander. 1846.

##### subsp. angustifrons,

##### Stärcke. 1927.

##### SCHENCKI, Emery. 1895.

##### Pheidolini, Emery. 1913-14.

#### STENAMMA, Westwood. 1840.

##### WESTWOODII, Westwood. 1840.

##### Solenopsidini, Forel. 1893.

#### SOLENOPSIS, Westwood. 1840.

##### FUGAX, Latreille. 1798.

#### MONOMORIUM, Mayr. 1855.

##### PHARAZONIS, Linnaeus. 1758.

#### ANERGATES, Forel. 1874.

##### ATRATULUS, Schenck. 1852.

##### Myrmicinini, Ashmead. 1905.

#### MYRMECINA, Curtis. 1829.

##### GRAMINICOLA, Latreille. 1802.

##### (latreillii, Curtis. 1829.)

##### Leptothoracini, Emery.

1913-14.

#### LEPTOTHORAX, Mayr. 1855.

##### NYLANDERI, Förster. 1850.

##### CORTICALIS, Schenck. 1852.

##### TUBERUM, Fabricius. 1775.

##### INTERRUPTUS, Schenck. 1852.

#### Subgenus MYCHOTHORAX,

Ruzsky. 1904.

##### ACERVORUM, Fabricius. 1793.







*Del. E. A. Cockayne.*

ABERRATIONS OF BRITISH MACROLEPIDOPTERA.



- FORMICOXENUS**, *Mayr.* 1855.  
**NITIDULUS**, *Nylander.* 1846.  
**Tetramoriini**, *Emery.* 1913-14.
- STRONGYLOGNATHUS**,  
*Mayr.* 1853.  
**DIVERI**, *Donisthorpe.* 1936.
- TETRAMORIUM**, *Mayr.* 1855.  
**CAESPITUM**, *Linnaeus.* 1758.  
*var. hammi*, *Donisthorpe.* 1915.
- Dolichoderinae**, *Forel.* 1878.  
**Tapinomini**, *Emery.* 1912.
- TAPINOMA**, *Förster.* 1850.  
**ERRATICUM**, *Latreille.* 1798.  
*subsp. ambiguum*, *Emery.* 1925.
- Formicinae**, *Lepelletier.* 1836.  
**Acanthomyopsini**, *Donisthorpe.* 1943.
- ACANTHOMYOPS**, *Mayr.* 1862.  
**(LASIUS**, *Fabricius.* 1805.  
*nec Jurine.* 1801.)
- Subgenus DENDROLASIUS*,  
*Ruzsky.* 1912.  
**FULIGINOSUS**, *Latreille.* 1798.
- Subgenus DONISTHORPEA*,  
*Morice & Durrant.* 1915.  
**NIGER**, *Linnaeus.* 1758.  
*var. alieno-niger*, *Forel.* 1874.
- ALIENUS**, *Förster.* 1850.  
**BRUNNEUS**, *Latreille.* 1798.
- Subgenus CHTHONOLASIUS*,  
*Ruzsky.* 1912.  
**FLAVUS**, *Fabricius.* 1781.  
**UMBRATUS**, *Nylander.* 1846.  
**MIXTUS**, *Nylander.* 1846.
- FORMICA**, *Linnaeus.* 1758.  
**RUFA**, *Linnaeus.* 1758.  
*var. rufo-pratensis*, *Forel.* 1874.  
*var. alpina*, *Santschi.* 1911.  
**PRATENSIS**, *Retzius.* 1783.
- Subgenus COPTOFORMICA*,  
*Müller.* 1923.  
**EXSECTA**, *Nylander.* 1846.
- Subgenus RAPTIFORMICA*,  
*Forel.* 1913.  
**SANGUINEA**, *Latreille.* 1798.
- Subgenus SERVIFORMICA*,  
*Forel.* 1913.  
**FUSCA**, *Linnaeus.* 1758.  
*var. glebaria*, *Nylander.* 1846.  
*var. rubescens*, *Forel.* 1904.  
**RUFIBARBIS**, *Fabricius.* 1793.  
**TRANSKAUKASICA**, *Nassonow.* 1889.  
*(picea*, *Nylander.* 1846.  
*nec Leach.* 1825.)

## ABERRATIONS OF BRITISH MACROLEPIDOPTERA.

By E. A. COCKAYNE, D.M., F.R.C.P., F.R.E.S.

(With 2 Plates.)

(Concluded from p. 75.)

The aberrations of British *Noctuidae* and *Geometridae* described below are in my collection unless otherwise stated.

*Sterrhia degeneraria*, Hbn.

**Ab. lactea**, ab. nov.

The ground colour of both fore and hindwings is cream colour, the markings are normal.

Type: ♀, I. of Portland, Dorset; J. Anderson.

In Mrs Hutchinson's collection in the British Museum are three similar specimens, and one from the Sydney Webb collection is figured in Barrett, *Lep. Brit. Isles*, Vol. 8. Pl. 334, fig. 1b.

*Anaitis efformata*, Guen.

Ab. **fimbriata**, ab. nov. (Pl. 2, fig. 10.)

On the forewing the basal, antemedian, and postmedian lines are absent; in other respects the wings are normal. The parallel form in *Oporinia dilutata*, Schiff., is ab. *fimbriata*, Haw.

Type: ♂, Aston Hills, Bucks., 11.v.1945; E. A. Cockayne.

Paratype: ♂, Aston Hills, Bucks., 24.v.1944; A. L. Goodson.

Other specimens of this aberration have been taken by Mr Alfred Hedges in the Bucks. Chilterns.

*Ortholitha chenopodiata*, L.

Ab. **fimbriata**, ab. nov.

The antemedian, postmedian lines and median band are absent on the forewing, the other lines accentuated.

Type: ♀, Liverpool, Capper coll. Figured by Barrett, *Lep. Brit. Isles*, Pl. 380, fig. 1d, and by Mosley, *Illustration of Varieties of British Lepidoptera*, "Eubolia," Pl. 1, fig. 1. The type is in the Rothschild collection, British Museum, Tring.

*Ortholitha bipunctaria*, Schiff.

Ab. **paradoxa**, ab. nov.

On the forewing the extreme base, the space between the basal and antemedian lines, and the whole of the marginal area external to the postmedian line are dark grey; the rest of the wing is pale grey and unmarked except for the discoidal spot; the border of the hindwing is dark grey.

Type: ♂, Box Hill, Surrey; O. Dannenberg. Figured *Proc. South Lond. Ent. and N.H. Soc.*, 1888-1889, Pl. 1.

There is a similar specimen in the Rothschild collection, British Museum, Tring, from the J. A. Clarke collection.

*Mesotype virgata*, Rott.

Ab. **paradoxa**, ab. nov.

The extreme base, the space between the basal and antemedian lines, and the whole of the marginal area external to the postmedian line are blackish grey, the remainder of the forewing is light grey; the border of the hindwing is dark grey.

Type: ♀, Doubleday Coll. Figured by Mosley, *Illustrations of Varieties of British Lepidoptera*, "Eubolia," Pl. 1, fig. 4.

*Nothopteryx polycommata*, Schiff.

Ab. **caliginosa**, ab. nov. (Pl. 2, fig. 3.)

The ground colour of both fore and hindwings is uniformly brown, and all the markings are very indistinct. The absence of the lighter markings and the obsolescence of the darker ones gives it a very distinctive appearance.

Type: ♂, Brighton, iv.1920; L. W. Newman.

Paratypes: 1 ♂, same data, 1 ♂, W. Sussex, bred iv.1917; L. W. Newman.

I have seen several other specimens from the same locality.



*Lygris testata*, L.

Ab. **sperringi**, ab. nov. (Pl. 2, figs. 4, 5.)

On the forewing the basal area is smaller, and the median area narrower than usual, but both are purplish in colour and well defined. The ground colour in the male is greenish ochreous. The thin secondary line in the basal area and both those in the median area are absent. The female differs in having the ground colour and the middle of the median area orange like ab. *achatinata*, Hbn.

Type: ♂, Exmoor, Somerset, bred vi.1930; A. H. Sperring.

Allotype: ♀, same data.

Paratype: ♂, same data.

*Thera obeliscata*, Hbn.

Ab. **nigrolineata**, ab. nov. (Pl. 2, fig. 6.)

The colour of the forewings is a uniform red-brown, the forewing is crossed by three narrow blackish lines, the basal, antemedian, and postmedian, and blackish lines run inwards from the postmedian along nervures 1, 2, 3, 4, 6, and 7 in the median area; there is a sprinkling of white scales along the costal and median nervures and near the inner margin.

Type: ♂, Newby Cross, Cumberland, 23.vii.1902.

This aberration resembles the Irish form of *Thera cognata*, Thnbg.

*Dysstroma truncata*, Hufn.

Ab. **wellmani**, ab. nov. (Pl. 2, fig. 7.)

On the forewing the median area is narrower than usual, the black postmedian line touching the discoidal spot in the female and nearly touching it in the male; the ante- and postmedian lines unite just before reaching the inner margin in the male and almost unite in the female; the median area is without markings and lightly sprinkled with black scales in the female, more heavily sprinkled in the male; the antemedian is bordered internally and the postmedian externally by a narrow white line; the basal area is dark grey, and between it and the antemedian is a red-brown band and there is another red-brown band external to the postmedian; the marginal area is dark grey.

Type: ♂, Bristol, bred 10.vii.1894 by J. R. Wellman from eggs given to him by Grigg.

Allotype: ♀, same data.

Paratypes: 1 ♂, 1 ♀, same data.

*Lampropteryx suffumata*, Schiff.

Ab. **paradoxa**, ab. nov. (Pl. 2, fig. 9.)

On the forewing the proximal part of the basal area, the space between the basal area and the antemedian line, and that external to the postmedian are deep fuscous as in ab. *piceata*, Steph., the rest of the wing is pale reddish brown; the discoidal spot is blackish. The hindwing is dark brown with a broad fuscous border. The pale median area with the conspicuous discoidal spot gives it a very distinctive appearance. It is comparable with *Entephria caesiata*, Schiff., ab. *paradoxa*, Lange.

Type: ♂, Rannoch, Perthshire, 1914; Pennington.

Mr Alfred Hedges, breeding ab. *piceata* from Rannoch, obtained this form in the F2 generation, and subsequently from a pairing of two ab. *paradoxa* found that all the offspring were *paradoxa*. It is recessive to *piceata*.

*Euphyia corylata*, Thunbg.

Ab. **costimaculata**, ab. nov.

Only the costal part of the median band on the forewing is present.

Type: ♀, Tongue, Sutherland., vi.1906; E. A. Cockayne. Figured *Trans. City of London Ent. Soc.*, 1907, 33, fig. 5.

*Abraxas grossulariata*, L.

Ab. **nigrocingulata**, ab. nov. (Pl. 2, fig. 11.)

There is a complete black median band extending outwards to obscure the orange fascia.

Type: ♀, "Figured Private Drawings."

A similar specimen in the Porritt collection, Tolson Memorial Museum, Huddersfield, is figured Barrett, *Lep. Brit. Isles*, Pl. 322, fig. 1e.

*Abraxas sylvata*, Scop.

Ab. **argyphea**, ab. nov. (Pl. 2, fig. 12.)

The ground colour of the forewing is greyish white and the rust colour is absent; the basal area is silvery grey with a line of dark brown bordering it externally; the large spot near the anal angle of both fore and hindwing is silvery grey ringed by a narrow line of dark brown.

Type: ♂, near York, 1898; R. Dutton.

Paratypes: 4 ♂♂, near York, 1898; R. Dutton. 1 ♂, Sledmere, Yorks., 1897; T. Maddison.

The aberration also occurs in the melanic form, ab. *obscura*, Tutt.

*Lomaspilis marginata*, L.

Ab. **nigrosparsata**, ab. nov. (Pl. 2, fig. 8.)

Both fore and hindwings are sprinkled with black scales, particularly along the nervures, giving a radiated appearance and partially obscuring the normal markings.

Type: ♀, Southport, 1909; W. G. Clutton.

*Gonodontis bidentata*, Clerck.

Ab. **fenestrata**, ab. nov.

The interneural spaces in the forewings or hindwings or both are so thinly scaled as to be more or less transparent, but the scaling of the nervures, margins, and fringes is normal.

Type: ♂, Oakley Wood, 1911; Chadwick.

Allotype: ♀, Manchester, 1901; B. H. Crabtree.

Paratypes: 2 ♀♀, Manchester, 1901 and 1902; B. H. Crabtree.

Ab. **nigrofenestrata**, ab. nov. (Pl. 1, fig. 11.)

This is ab. *fenestrata* occurring in ab. *nigra*, Prout, and is much more conspicuous.



Type: ♂, Cheshire, bred iv.1938; C. Greenwood coll.

Allotype: ♀, same data.

Paratypes: 2 ♂♂, 10 ♀♀, same data.

1 ♂, Huddersfield, 9.v.1908; Raynor. 1 ♀, Manchester, 1905; B. H. Crabtree. These two aberrations are doubtless determined genetically and are comparable with *Lasiocampa quercus*, L., ab. *fenestrata*, Gerh.

**Ab. paradoxa**, ab. nov. (Pl. 1, fig. 10.)

The basal and marginal areas are dark brown, but the median area is pale.

Type: ♂, I. of Lewis, Outer Hebrides, 1901; MacArthur.

Paratype: ♂, ?Windermere, circa 1920; W. Mallinson.

**Ab. ferruginea**, ab. nov.

The forewings are a deep but bright ferruginous colour with the transverse lines indistinct; the hindwings are less rufous.

Type: ♂, I. of Lewis, Outer Hebrides, 1901; MacArthur.

*Pseudopanthera macularia*, L.

**Ab. brunneata**, ab. nov. (Pl. 2, fig. 2.)

The ground colour of the wings is brown instead of orange, but the markings are normal and clearly visible.

Type: ♂, New Forest, 12.vi.1934: J. Hope.

A similar male taken in the New Forest by Gulliver is in the Rothschild collection, British Museum, Tring.

**Ab. elegans**, ab. nov. (Pl. 2, fig. 1.)

The only markings on the forewing are the basal line, the large discoidal spot, and a complete submarginal stripe; there are a few dark speckles on the costa and inner margin; on the hindwing the discoidal spot is present, and there is an almost complete submarginal dark stripe; there are a considerable number of speckles at the base, along the inner margin, and rather fewer along nervure 1; elsewhere they are very sparse. The absence of most of the usual spots and the confluence of those remaining to form a submarginal band makes this a most beautiful and remarkable aberration.

Type: ♂, Chiddingfold, Surrey, 1923; F. Pennington.

In addition to the photographs of some of the aberrations described above I give one of the type of *Panolis flammea*, Schiff., ab. *albojuncta*, Turner (Supplement to Tutt's *British Noctuae and their Varieties*, vol. 2, p. 204 (1939). I also give a photograph of a male of *Selenia bilunaria*, L., ab. *infusata*, Strand. At least seven specimens of this rare aberration, 4 ♂♂, 3 ♀♀, were bred by L. W. Newman from N. Kent stock. They appeared in a third generation in September 1933. All the moths in the first two generations, including the parents of the brood containing the aberrations, were normal, and with the *infusata* a considerably larger number of normal moths were bred. Two pairings of *infusata* were obtained but the eggs were infertile. There can be little doubt that ab. *infusata*, Strand, is an autosomal recessive.

**THE MALE GENITALIA OF ADOPOEA LINEOLA, OCHS., AND  
A. SYLVESTRIS, PODA (LEP.).**

(With Plate XII.)

By BERNARD VERDCOURT, B.Sc.

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The difficulty experienced in naming several very battered specimens of *Adopoea* led to an investigation of the genitalia of authentic specimens of both species. The differences are marked and the battered specimens devoid of antennae were easy to name on examination of their genitalia.

The general differences may be seen by comparing the accompanying photomicrographs and there is no need for any description. The unci and claspers show very distinct differences. Two small points on microtechnique may be of value. The use of a yellow filter considerably improves photomicrographs of genitalia. Mr A. F. O'Farrell recommends the use of "Euparal" (*The Amateur Ent.*, 1941, Vol. 5, No. 38, p. 37) as a mounting medium, since it obviates the use of absolute alcohol, which is difficult for amateur microscopists to obtain. It may be worth mentioning that dehydration may be carried out in acetone (if no alcohol of any kind is available) prior to mounting in Euparal.

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**A HEREDITARY FORM OF SPILOSOMA LUBRICIPEDA, L.  
(MENTHASTRI, ESP.).**

By B. J. LEMPKE.

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In June 1941 I received a batch of ova laid by a female of *Spilosoma lubricipeda*, L. (*menthastri*, Esp.) found in copula in a marshy spot in the Dutch province of Utrecht. I decided to breed the whole batch as the species is always very interesting from the point of view of variation. Well, I may say that fortune stood me. It was, however, not an interesting colour form that I obtained, nor the fine f. *godarti*, Obthr. (rare in Holland) but something I had not in the least expected!

I bred the caterpillars in an old aquarium with a layer of peat-dust on the bottom and fed them with plantain, dandelion and burdock (*Lappa*), a diet on which they thrived excellently. In about two months all were full-grown and had pupated among the peat-dust. Not a single specimen emerged that year as a second generation and it was not until a fine day in the beginning of May 1942 that the first "White Ermine" made its appearance. A glance at the beautiful creamy forewings: nothing particular, spotting quite normal. As I opened the wings, however, somewhat with my forceps to look at the posterior ones, I suddenly observed that the abdomen did not look as it should be: the black spots were wanting! A more careful inspection after the specimen had been set showed, however, that not all rings lacked the spotting. The second and third (counted from the thorax) as well as the penultimate one possessed still their black dorsal spot. The two lateral rows of black dots were present on all rings of the abdomen.

I consider this form identical with f. *pura*, Vorbrodt, *Mitt. Schweiz. Ent. Ges.*, 12: 493, 1917 (*flavotergata*, Kardakoff, *Ent. Mitt. Dahlem*, 17: 415, pl. 8, fig. 7, 1928), described after two specimens from Marog-





Del. B.V.

1. ADOPOEA SYLVESTRIS  $\times$  28.8.    2. ADOPOEA LINEOLA  $\times$  28.7.





gia in South Switzerland (and by Kardakoff after two ♂♂ from Narwa in East Siberia), which has "the abdomen on the back pure yellow, the last segment pure white; the black points which otherwise divide the abdomen longitudinally fail completely," to quote the original description. It is true that my specimen does not fully answer to this description as there are still a few dots left, but the appearance of one example in the  $F_2$  generation without any dorsal dot proves that Vorbrodt's form is only the extreme of the one I obtained. The form was not yet known from Holland and when I once more examined the series of our most important museums (Amsterdam and Leiden) later on, I did not discover a single specimen of it. It is no doubt rare with us.

It will be clear that after this successful start I examined the abdomen of every specimen that emerged and registered all examples of the brood. Happily enough, my acquaintance who had given me the ova had kept the parents and set them. It now appeared that the ♂ belonged to the variety, whereas the ♀ was typical.

The  $F_1$  generation consisted of 3 forms.

34 ♂♂ and 30 ♀♀ were typical.

7 ♂♂ and 4 ♀♀ were intermediates, but they were not homogeneous. In some of them all rings were spotted, but the dorsal spots strongly reduced in size, in others only one or two rings were unspotted.

11 ♂♂ and 15 ♀♀ belonged to the variety.

So the result was: 64 typical, 11 intermediate, 26 variety—a result I cannot explain. If we count the first two groups together, we get 75 against 26, a very near approach of the proportion 3:1, well known in the  $F_2$  generation of a recessive form, but how to interpret it in  $F_1$ ?

As my examples were the first known from Holland (and, if I rely on literature, even from Western Europe), I would try to get a nice series in order to supply our museums with a number of them. So I carefully selected a fine full-sized ♂ and ♀ which showed the characters of my interesting form very clearly. As the result of the  $F_1$  generation had clearly shown that it was an hereditary one, I expected an  $F_2$  which would consist of none but *pura*. The result was, however, a bit different! Part of the brood emerged already in 1942 as a second generation, 4 ♂♂ and 14 ♀♀. They were all typical! Of those which made their appearance in the spring of 1943, 1 ♂ and 8 ♀♀ were typical, 2 ♂♂ and 2 ♀♀ intermediate and only 1 ♂ and 3 ♀♀ belonged to the variety. So the result of the  $F_2$  was: 27 typical, 4 intermediate, 4 variety. As I stated already, one of the latter was an extreme specimen without any dorsal dots. The majority of the examples died in the pupal stage, which accounts for the small number of specimens obtained in the  $F_2$ —35 in all. And of those which succeeded in emerging not a few were undersized. I do not want, however, to exclude the possibility that this not very splendid result may have been caused by a less attentive treatment of the brood owing to the war circumstances.

I did not continue the inbreeding as the result of the  $F_2$  was very disappointing and as my stock was strongly weakened. But I had at any rate obtained a very remarkable result. I only hope that an expert in hereditary questions will give me the solution of the problem.

Amsterdam—Z., Oude Yselstraat 12 III.

[As Mr B. J. Lempke says, the ratios are not simple mendelian ones. *Pura* cannot be recessive, and since it appeared in three successive

generations it is probably dominant, but the ratio expected in the  $F_1$  generation is 1:1, whereas there were 26 *pura*, 11 intermediate, 64 typical, or counting the intermediates as *pura*, 37:64. In the  $F_2$  generation, of which both parents were *pura*, the ratio expected is 3 *pura* : 1 typical, but there were 4 *pura*, 4 intermediate, 27 typical, or counting intermediates as *pura*, 8:27. It is evident that the intermediates are not heterozygous and the *pura* homozygous. The original parent was *pura*, and if *pura* is homozygous, all the moths should have been intermediates in the  $F_1$  generation, whereas *pura* appeared and outnumbered the intermediates, and typical moths outnumbered both together. In the  $F_2$  generation the ratio of *pura* to intermediates should have been 1:2, but actually there were more *pura* than intermediates. We must therefore regard both *pura* and intermediates as heterozygotes. The outstanding feature of both  $F_1$  and  $F_2$  generations is the great excess of typical specimens. The excess is not due to sex control, for the sexes of both *pura* and intermediates are approximately equal. Something prevents the expression of the gene for *pura*, and some moths genetically *pura* are typical or intermediate in appearance. If it were merely a case of incomplete dominance and the expression of the *pura* character were suppressed by the action of other genes, one would expect a closer approximation to the expected ratio in the  $F_2$  than in the  $F_1$  generation. Actually the approximation is much less close. Selective mortality is unlikely to be the cause, for the death rate was not unduly high in the  $F_1$  generation. It seems to me that the most probable explanation of the unusual ratios is that *pura* is due to the combined action of a genetical and environmental cause. In the  $F_2$  generation all the 18 moths that emerged in the autumn of 1942 were typical, whereas of those that emerged in the spring of 1943, 9 were typical, 4 intermediate, and 4 *pura*. This suggests that temperature is the environmental cause suppressing or modifying *pura*.—E.A.C.]

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### SOME UNUSUAL FORMS OF GENITALIA.

(With Plate XIII.)

By Rev. DESMOND MURRAY.

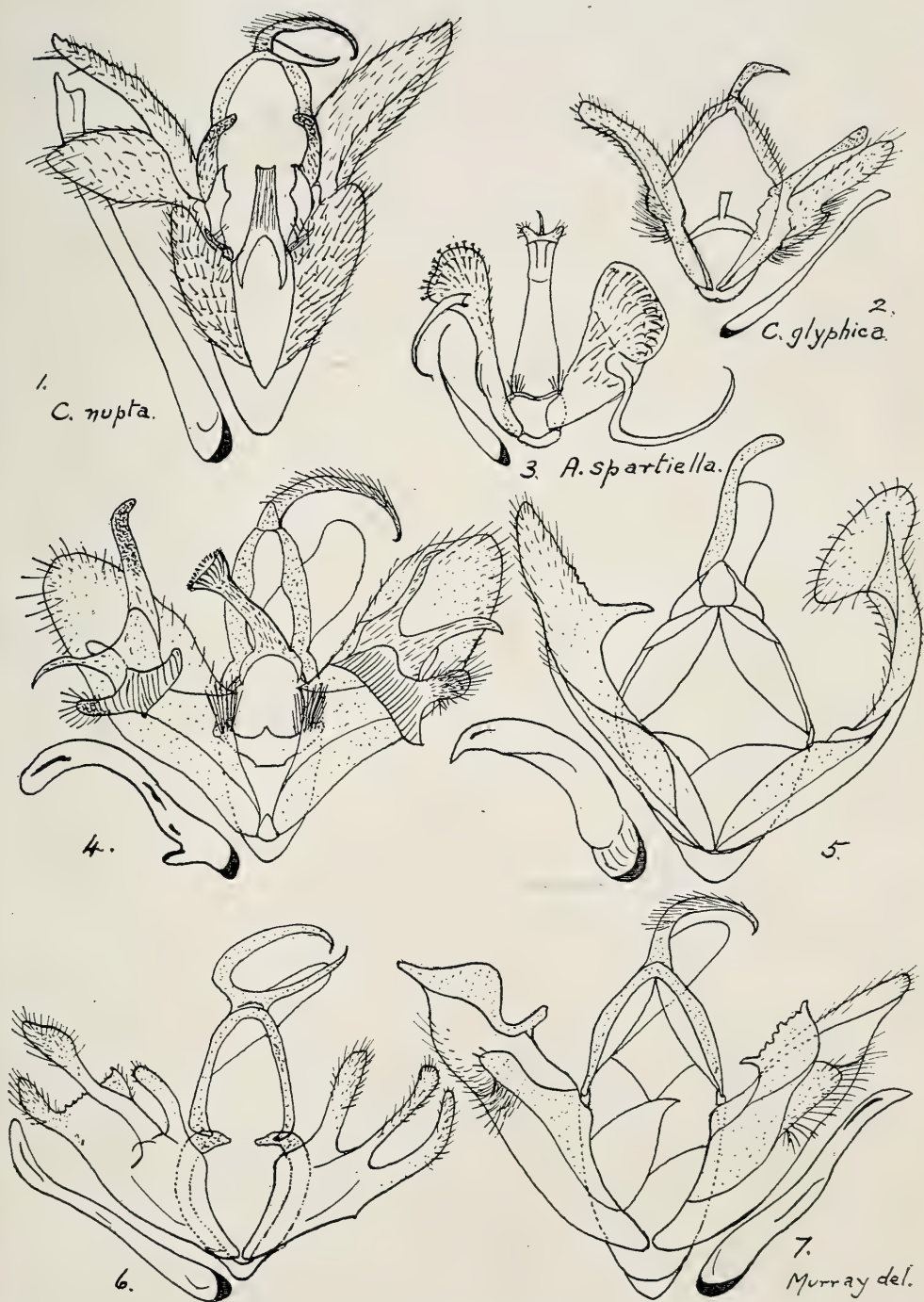
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There is an extraordinary uniformity of form in the reproductory organs of Lepidoptera; in practically every case the two sides of the male organ are symmetrical. This regularity is constant and it was from this constancy of form that the study as a whole was able to be built up.

Pierce was able to say (with regard to our own species) that he could tell in nearly every case what insect the organ belonged to when shown a particular example, although he had not seen the perfect insect. His work is based on the principle that each species has its peculiar form of genitalia and so our insects can be readily classified by this means.

Of course the study should not be divorced from such exterior characters as wing formation, colour, structure, as well as the early stages and similar vital factors but each and all should be studied together, making a complete whole. It is evident then that the study is of great value to entomologists, of essential importance in the differentiation of one species from another and family from family.





SOME UNUSUAL FORMS OF GENITALIA (LEP.).





There are, however, exceptions to every rule, for though it is found that ninety-nine per cent are perfectly regular in form, both sides or the valves and other duplicate organs being identical in shape, in a few cases, or in about one per cent., they are not symmetrical.

Thus, in the case of the British Noctuae, out of approximately 350 species described and figured by Pierce only four species have distinctly asymmetrical forms of genitalia. These are: *M. oxyacanthae*, *C. alchymista*, *C. nupta* and *E. glyphica*.

Whether the same proportion is to be found in the family as a whole, from other parts of the world, cannot be stated for so far these are very imperfectly known; nor have the hosts of other species belonging to different families been sufficiently studied.

In the examination of several hundred Noctuae and Geometridae from S. America, the proportion was found to be slightly more than one per cent.

Some of these forms have already been given in a paper published last year (*Ent. Record*, LVI, II, November 1945) and a few more are given here. The mounts were made from specimens in the author's own collection and drawings made with the aid of the camera lucida.

It is reasonable to ask why these asymmetrical forms occur at all, for there must be some explanation. They are not just "sports" or abnormal forms which are known to both the zoologist and the botanist as occurring occasionally in the animal and vegetable kingdoms, because just as the ordinary form in Lepidoptera is invariably constant, so also is the asymmetrical form.

Pierce suggested that they represented transitional forms. It is interesting to find that Meyrick held that the Pterophoridae (Plume Moths) are of comparatively recent origin (*Gen. Ins. fasc. 100 m. Wytsman*, Brussels, 1910).

He infers that they must have originated not only late in time but at a period when Asia (taken as the centre of their origin) was completely isolated from other regions by wide seas. Their general structure seems especially adapted to extreme lightness, which facilitates easy distribution by wind and by this means they have apparently spread rapidly over the whole earth's surface. Some 370 species of this family were then known (1910), probably many more have been recorded since. (*Cf. also Trans. Suffolk Nat. Soc.*, Vol. V, 1942.)

Of course the theory of Meyrick is only a theory, which may or may not be true, but the group is a very compact one that lends itself to study as a whole. The only point in giving this example is that amongst the Pterophoridae we find a much larger proportion of the genitalia are not symmetrical. Amongst our own species and closely related genera, out of about 30 given by Pierce nearly half the number show asymmetrical forms. Taken in conjunction with the statement that this irregularity represents transitional forms, we may find the explanation as to why they differ so markedly.

The key, however, may have to be sought elsewhere, since the phylogeny of species is still uncertain ground upon which to base conclusions. Until more is known about one or several world-wide families there can be no certain explanation of the asymmetrical forms. Except for the names and to some extent area of distribution little else is known of the vast majority; nor would it be easy to prove them to be forms in

course of transformation. Perhaps we might make a plea for a more general study of foreign species in order that comparison may be made with our own examples. Until this is carried out, such generalisations cannot be of much value.

The examples given are, first, the male genitalia of two well-known moths, i.e., *nupta* and *glyphica*. One example is given from the *Tineina* to show that asymmetry occurs amongst these tiny insects also. Then four examples of species of Agrotidae from Paraguay, S. America, follow.

1. *Catocala nupta*, L. Left valve of thin membrane; right valve peaked.
2. *Euclidia glyphica*, L. Left valve, long armed. Right valve divided into two shorter arms, inner arm sharply elbowed, extends to a long scobinated club, tipped with a sharp point.
3. *Anarsia spartiella*, Schrk. Left valve narrow below, apex wide emitting a slightly bent rod. Right valve ovate, a long curled rod springs from near the base.
4. *Agrotis* sp. The valves regular but the armature of each quite different and elaborately formed. The central arm is the labis, i.e., an organ arising from the transtilla. *Light Brown 30 mm.*
5. *Agrotis* sp. Left valve pointed, with a prominent inner spur. Right valve club shaped. *Dark Brown 50 mm.*
6. *Agrotis* sp. Left valve divided into three separate arms, the centre one very long, clubbed. Right valve divided into three equally long arms. *Brown 45 mm.*
7. *Agrotis* sp. Left valve larger than right, with a curved blunt point. Right valve shorter with elaborate armature. *Dark Brown 30 mm.*

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### COLLECTING NOTES FROM WARNHAM, SUSSEX.

By S. WAKELY.

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Owing to a war "incident," I was forced to leave Norwood in July 1944, and for some months resided at Warnham, near Horsham, Sussex.

It was a pleasant change to see *Argynnis paphia*, Linn., in one's garden flying round the bramble blossoms, and I soon had a sugar-round going on trees around the cottage. The "sugar" was mostly made up with fallen fruit, of which there was plenty to be had. *Xylophasia hepatica*, Huebner, was one of the commonest insects taken in this manner, some of the light forms of which being very like *X. crenata*, Hufnagel (*rurea*, Fab.)—in fact, at first I believed them to be that species. A fine pair of *Cosmia pyralina*, Schiff., occurred side by side on 6th July, but I saw no more of this local species. *Amphipyra pyramidea*, Linn., also swarmed a little later, and this species was greatly appreciated by a family of bats living in the roof, as evidenced by the numerous detached wings which fell from the eaves.

A wood nearby produced a few larvae of *Thecla betulae*, Linn., and larvae of *Brephos notha*, Huebner, were common on the aspens. Larvae of *Polyphoca ridens*, Fabr., were also common on the oaks, and I succeeded in rearing a nice series. There were a number of lime trees growing in this wood, and the wild pear was also a feature of the district. The sweetly-scented Butterfly Orchid (*Habenaria virescens* (Zoll.) Druce) was abundant in one part of the wood under the aspens.



At Roman Gate, a few miles away, there was a colony of *Procris statices*, Linn., and at the same spot I took a few specimens of *Eidophasia messingiella*, F. v. R., flying at the edge of a corn field in the afternoon. The plant *Lepidium smithii* was growing freely here, and I strongly suspect this was the foodplant. I also found odd specimens of *E. messingiella* in the garden at Warnham.

By the small brook near Warnham station was found a large clump of *Scutellaria galericulata*, and a long series of *Choreutis myllerana*, Fabr., was bred from a bunch picked for the purpose.

The galls of *Mompha decorella*, Steph., were common on *Epilobium montanum* both near the cottage and in the woods. Two larvae of *M. locupletella*, Schiff. (*schrunkella*, Huebner) were found in leaves of *Epilobium lanceolatum* and imagines bred.

A loft was frequented by several hibernating species, the first noted being *Acrocercops brongniardella*, Fabr. Stainton gives two broods for this, while Meyrick only mentions one. In early June the larvae were frequently met with on oak in the lanes. The larvae are gregarious, several mining in one leaf, their feeding causing the top skin of leaf to rise in a blister over greater area of leaf, giving it a striking silvery appearance. These emerged at end of June, and odd fresh specimens were seen at this time hibernating in the loft. Individuals were noted in the same places for many weeks, but at the end of July there were a number of fresh feeding places on the oaks, and from these moths emerged in August. The specimens in the loft were noted to be in the same positions during this time, but sought less exposed positions as colder weather set in. This seems conclusive evidence that there is a partial second brood—in some seasons at any rate.

Another species which invaded the loft for hibernation was *Orneodes hexadactyla*, Linn., and a nice series was taken during August.

*Lithocolletis geniculella*, Rag., was also found in the district, together with *L. acerifoliella*, Zell. (*sylvella*, Haw.).

During August privet leaves twisted into cones were noticed along a drive hedged with oval-leaved privet. These cones seemed to be too uniform in shape for the common *Gracillaria syringella*, Fabr., and in September I bred a series of the local *G. cuculipennella*, Zell. This species was not common and needed careful searching for.

During the first week in August I swept a specimen of the Adela *Nemophora minimella*, Zell., among *Scabiosa succisa*. Renewed sweeping on various occasions yielded a small series of *N. cupriacella*, Huebner, a much more local species, but no more *N. minimella* were met with. Apparently sweeping is the most productive way of getting *N. cupriacella*, but it is advisable to examine the contents of net very frequently or the specimens get sadly knocked about.

I might mention that the local bug *Stollia (Eysarcoris) fabricii*, Kirkcaldy (*melanocephala*, Fabr.) was swarming near the cottage on its foodplant, *Stachys sylvestris*.

The handsome Neuropteran, *Osmylus fulvicephalus*, Scop., occurred in the district by a small river on the Billingham road, together with the dragon fly, *Agria virgo*, Linn.

In September 1945 I was able to return to London, thus preventing further observation of the Lepidoptera of this pleasant locality.



### COLLECTING NOTES.

---

**VOLUCELLA INANIS, L., IN THE LONDON DISTRICT.**—Having just read the note of this Syrphid being taken at S. Norwood, S.E.25, in 1943—*E.R.*, Vol. lvi, p. 33, March 1945—I should like to record a capture of this species in N. London. This was taken on 1st September 1943 (when living at Highgate) in my house, which backed on to Highgate Woods.—H. W. JANSON (F.R.E.S.).

**ALTERNATIVE FOOD-PLANTS.**—The notes which have appeared on this subject remind me that last autumn I found two young larvae of *Arctia caja* enjoying an unexpected food. They had found two Cox's Orange Pippin windfalls and were busily engaged in sinking quite appreciable pits in the fruits.—J. A. SIMES.

**LARVAE OF ARGYNNIS CYDIPPE AND A. NIOBE.**—Mr Prideaux's reference on p. 38 to this larvae of *Argynnis cydippe* (*adippe*, L.) moving "at a pace that an Arctiid larva could hardly rival" has reminded me of a similar experience I had in June 1922 with a larva of *Argynnis niobe* at La Grave in Dauphiny. It was on a hillside at the edge of a pine wood that a distinct rustling of the fallen needles became perceptible; and, looking down, I saw the larva moving at high speed. It thus covered a distance of well over two yards and then headed for a minute plant of *Viola hirta* which it seized with its forelegs and proceeded to demolish. I eventually boxed the larva which produced a fine female. The empty pupa-case I still retain.—J. A. SIMES.

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### CURRENT NOTES.

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**THERE** has just come to our table a new magazine, *South African Insect Life*, the organ of a recently-established Entomological Society of S. Africa, which has its locale at Pretoria. The first number has 52 pp. and contains nearly 20 short articles with a few text figures. Several of the articles are in Africander but most of them are in English. A. J.-T. Janse, D.Sc., F.R.S.S., contributes an account of the Death's Head Moth of S. Africa, of which there is a figure.

**THE Boll. R. Lab. Ent. Agraria Portici 1939-40** has recently come to us from Italy. It is a large quarto volume (III) of 353 pp. and many illustrations. It contains seven Memoirs of which the most interesting to us were (I) Contributions to our Knowledge of the Insects which do damage to the Cotton in the Italian African territory, (II) Contribution to the Lepidopterous Fauna of Rhodes. The latter is 116 pp. of matter, with 54 illustrations and 2 plates with 33 and 16 further figures, giving the biological facts of 15 species: *Platyedra gossypiella*, Meyr., *Mometa zemiodes*, Durr., *Acrocercops bifasciata*, Wlsm., *Pyroderces coriacea*, Snell., *Corcyra cephalonica*, Stain., *Sylepta derogata*, Fb., *Argyroproctus leucotreta*, Meyr., *Spilosoma investigatorum*, Krsch., *Earias*

*biplaga*, Wlk., *E. insulana*, Bdv., *Diparopsis castanea*, Hamp., *Heliothis armigera*, Hb., *Prodenia litura*, Fb., *Cosmophila flava*, Fb., *Euproc-*

*tis fuscata*, Wlkr. An excellent piece of work by P. Russo. III. Records from the Island of Rhodes so far give a List of 189 Lepidoptera; 43 Rhopalocera, 4 Zygaena, and 5 Sphingids, etc.

EVERYONE, who is engaged in doing work of a literary character, must have one Dictionary at least at his elbow; if he specializes he must have a dictionary dealing with his particular need. Even if he only reads the newspaper or a varied assortment of books, there are many terms which must be unknown or new, which can only be adequately translated by a dictionary. To all those who enjoy the country and its wonders and have acquired a fair general knowledge of the insects they meet and have begun to lean towards, the butterflies, the flies, the beetles, the lace-wings, the bugs, etc., they sooner or later wish to know the place they hold in the schemes of animal life, must ere long wish to know the relatives which they may come across. How many garden whites, how many blues, etc., and most of all the *correct* names of each and all he is likely to get in this country. He may not be able to obtain the rather expensive volume but he should be able to consult it in the Public Library nearest to him. In fact every, yes, every Public Library should possess a copy of the List recently compiled of every INSECT species occurring in these Islands, even if only as a casual visitor. I personally for many years have wanted to consult really dependably perfect lists of our Insect Fauna. This List has been brought out by Kloet and Hincks on their own initiative to help Entomologists. These as editors are not to be blamed for any errors, especially spelling, which may have arisen, as they have faithfully copied the multitude of Lists obtained from specialists in all the Orders of Insects and in the more comprehensive Orders where specialists dealt with groups separately they had to combine the group lists in a satisfactory manner. Mr Donisthorpe has sent us a criticism of the List of British Ants with remarks and improvements in the List furnished for the List in Kloet and Hincks. This is now published in the July number of this magazine.

WE have received two volumes, of a projected series of eight, on "Gall Midges of Economic Importance," by H. F. Barnes, M.A., and published by Messrs Crosby Lockwood; price, 13s 6d and 15s. Four are to be published this year and four in 1947. Vol. I deals with the galls of "Vegetable Crops and Roots," and Vol. II with those of "Fodder Crops." The volumes are of a handy size, well-bound and adequately illustrated with figures natural size, enlarged figures and diagrams. Colour is used in numerous cases, not flaring and obtrusive, but soft and as near to natural tints as possible. In fact, the whole scheme has been most carefully controlled so as to be useful. Each of the species is introduced generally, diagnosed for recognition and the damage it causes described. Observations made by well-known authors in the past and the Life-history is given with the foodplants usually attacked. The natural enemies are given and ecologies are explored with reference to allied species, which may be at times suspected. Finally, the Control Measures are described, with, in this species 20, references. This scheme is followed with each species and the volume has a voluminous Index of 11 pages preceded by a Bibliography of 222



works. These volumes are well and plainly printed, and the matter classified and displayed to afford easy reference. The price of the volumes will vary.

THE *Soc. Ent. de France* is publishing its *Bulletin* quite regularly now; and this month we have received the Russian, *Rev. Russe d'Entomologie*, No. 1-2, 1945, the publication of the Soc. Ent. de l'U.R.S.S.

A QUERY has reached us from a new subscriber, who is anxious to breed hybrids of hawk-moths with "*Atropos*, *Convolvuli*, *Galii*, and the *Macroglossa*"! He says "Do you think I can get any of these?" Hybrids can only be obtained, if at all, between species that are *very, very closely genetically related*, and then so rarely that their occurrence seems to be accidental. The attempts are mainly failures and only those, who are expert breeders from long experience attain a few successes. Those species mentioned have very far from close relationship and have no other British species with which to attempt pairing. Our reader must consult Vol. V of Tutt's "*British Lepidoptera*," and study well the 66 pages of matter in which the author summed up all that was known of hybridization and the results which had been obtained. Another most useful book to consult is Standfuss's work, with its beautiful plates, published at Jena in Germany. Before our subscriber starts he must read up all he can on the subject and get thoroughly skilful in breeding Lepidoptera; let him try the influence of temperature, extreme cold, extreme heat, dry and damp, hot-house atmosphere, etc., and he will get, after many trials, results worthy of his work, of which he should not fail to keep full detail notes.

THE Argentine *Revista Soc. Ent. Argent.* for 1945 has just come to hand. It contains among other items a well illustrated account of the Life-history of *Megalopyge undulata*, of which the Argentine subsp. is *vulpina*, Berg. There is one plate and several text figures. Another item is an article on the *Ascalaphus* group of the Neuroptera with a double plate of those species found in the Argentine, with descriptions, references and distribution details of all the indigenous species in the country. The two articles on Coleoptera, *Curculionidae* and *Chrysomelidae* are also well illustrated as is the paper on the *Adimantus* species of the *Acridiidae*.

THE *Ascalaphidae*, "Owl-Flies," are a Family of the Order Neuroptera lying among the Lace-Wings between the Ant Lions, *Myrmeleonidae* (known as "Doodle Bugs" in America), and the *Mantispidae*, False Mantids. The *Ascalaphus* "Lace-wings" have very long knobbed antennae, the Ant Lions have very short knobbed antennae, and the "False Mantids" have thread-like antennae and, like the Mantids, have comparatively huge predatory clawed forelegs as in a real Mantis. There are at least three species of *Ascalaphus* in Europe.—HY. J. T.

THE *Entomological News* (Philadelphia) for March contains rather an important item for Dipterists. "A Translation of the Introduction and Preface to Meigen's 1800 Paper on Diptera." This is probably of both interest and use to the student of this Order of Insects as the Works of Meigen still continue to be a subject of extreme controversy.

## EXCHANGES.

- Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.
- Wanted**—American Hesperilidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.
- Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.
- Wanted**.—*Lycaena (Heodes) phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. *Duplicates*.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.
- Wanted** for cash or exchange many species of ova, larvae or pupae, especially local forms and *A. grossulariata* from different localities, also Seitz Vol. 1 and Supplements to Vols. 1-4. Offers also, Tutt's *Practical Hints*, Parts 1 and 2, Buckler's larvae, Vols. 1-6, and Tutt's *British Noctua*, Vols. 2, 3, and 4.—Dr J. N. Pickard, F.R.S.E., 36 Storeys Way, Cambridge.
- Wanted**.—Various monthly parts of *Entomologist's Record* for 1914, 1915, 1916, 1917, 1919, and 1920. Please report any odd monthly parts (in wrappers as issued) prior to these years.—P. B. M. Allan, 4 Windhill, Bishop's Stortford, Herts.
- Wanted**.—Males of *Morpha menelaus*, *M. didtus*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.
- Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.
- Wanted** for purchase or exchange, pupae of *Smerinthus ocellatus*.—E. S. A. Baynes, F.R.E.S., Monkshatch Cottage, Compton Guildford.
- Wanted**.—The two volumes (bound or in parts) of the second "Deuxieme Partie Geometres only of Culot's Noctuae et Geometres d'Europe."—Brig.-Genl. B. H. Cooke, C.M.G., C.B.E., D.S.O., F.R.E.S., 86 Osborne Road, Windsor.
- Desiderata**.—No. 8 Black Pins for Cash or Exchange.—A. J. Wightman, "Aurago," Pulborough, Sussex.
- Wanted**, set or in papers, perfect specimens of *Lycaena arion*, *L. corydon*—vars. *syngrapha* and *semi-syngrapha*, *Thecla betulae*, *T. w-album*, *Nemeobius lucina*, *Vanessa polychloros*, and *Papilio machaon*, in exchange for British, Indian, Australian, African and American Rhopalocera, in papers.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.
- Wanted**, British butterflies, set or in papers, in exchange for *Morpho papirius*, *Morpho didama*, and other Morphos.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.
- Exchange**.—I would like to get in touch with those interested in exchanging living ova and larvae of southern species of Lepidoptera for northern species and adults. Write stating wants and probable offers.—J. K. Goody, Weldon, 26 Carr Wood Road, Bramhall, Cheshire.
- Books Wanted**.—Burr, M.—1936—British Grasshoppers and their Allies. Chopard, L.—1922—Orthoptères et Dermaptères. Fowler, W. E.—1887-91—Coleoptera of the British Isles, either of Vols. I-IV Col. pls. For Sale—Saunders, E.—1892—Hemiptera-Heteroptera of the British Islands (without plates), £1.—H. G. Stokes, 12 Roman Road, Salisbury, Wilts.
- Wanted**.—*Entomologist's Record*, 1911-37, bound or unbound. Offered:—Various volumes of *The Entomologist*.—B. O. C. Gardiner, "The Red House," River-in-Dover, Kent.
- Wanted**.—Information re literature on West African Lepidoptera.—Surgeon Lt. H. M. Darlow, R.N., F.R.E.S., Corr House, Glebe Road, Bedford.
- Wanted**.—Buckler's *Larvae*, Vols. 7, 8 and 9. Meyrick's *Rev. Handbook of Br. Lepid.* Scorer's *Entomologist's Log Book*. Imm's *Outlines of Entomology*.—C. Bignell Pratt, 1 West Ham Lane, Stratford, E.15.



## MEETINGS OF SOCIETIES.

*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: October 2nd and 16th; at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1: Meeting for June 26th is cancelled: July 24th, meeting at Linnean Society's Rooms, Burlington House. August 14th and 28th, at Royal Society's Rooms; 6.0 for 6.30 p.m. *London Natural History Society*, London School of Hygiene and Tropical Medicine, Keppell Street, Gower Street, W.C.1: Sectional Meetings on first Tuesday and General Meetings on third Tuesday of each month, 6.30 p.m. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

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All Communications should be addressed to the Acting Editor, **HY. J. TURNER**, "Latemar," 25 West Drive, Cheam.

*Change of Address*:—E. P. Wiltshire, Esq., to British Consulate General, Cairo, Egypt, as from August 1st. Will correspondents in the British Isles address (for Bag to Cairo) E. P. Wiltshire, Esq., c/o Foreign Office, Downing Street, London, S.W.1.

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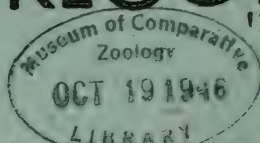
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No. 9

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# ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION



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By HENRY J. TURNER, F.R.E.S., F.R.H.S., *Editorial Secretary.*

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Hon. Life President, South London Ent. & N.H.S., etc.

## GREETINGS TO Mr H. J. TURNER ON HIS NINETIETH BIRTHDAY.

(WITH PORTRAIT).

---

**H**IS Co-Editors of the *Entomologist's Record* extend their heartiest congratulations and good wishes to

Mr HENRY JEROME TURNER

on the attainment of his Ninetieth Birthday, on 27th August 1946.

---

Mr Turner has been a contributor to the pages of the *Record* since its first volume in 1890. In December 1909 his name was added to those of the Editorial Staff and, since the death in January 1911 of Mr J. W. Tutt, our Founder and first Editor, Mr Turner has carried out the editorial duties over a period already exceeding thirty-five years. These duties have been rendered more burdensome by two World Wars and we feel that this special occasion of his Ninetieth Birthday provides us with a fitting opportunity to acknowledge our sense of indebtedness to him.

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## THE LONGICORN COLEOPTERA OF WALES.

By RAYMOND R. U. KAUFMANN.

Of the 51 Longicorn beetles which are known to be established in Great Britain, a figure which excludes such species as *Obrium brunneum*, F., *Lepideella brevipennis*, Muls. and *Plagionotus arcuatus*, L., about which there is still some considerable doubt as to their right to be classed as truly indigenous; such forms as *Rhagium inquisitor*, L., *Judolia sex-maculata*, L., *Pogonocherus fasciculatus*, Deg. and *Acanthocinus aedilis*, L., which are typically Scottish in distribution, though some of the latter have turned up accidentally elsewhere; and *Oberea oculata*, L., now confined to the Cambridgeshire fens, 33 have now been recorded from the Principality, and of these, three are fortuitous introductions.

A summary of early Welsh records is to be found in the works of Curtis and Stephens, the latter drawing largely upon material furnished by L. W. Dillwyn and G. Waring. Thereafter, records from Wales have been few and far between, J. R. le B. Tomlin's 1914 Glamorgan-shire list being the most comprehensive. The following analysis, grouped into counties, shows the present state of our knowledge of these insects' distribution in Wales:—

County	BR	CD	CM	CR	DB	GM	MG	MN	PB	RA	Un- classed
No. of species found	1	6	1*	7	11	27*	4	9	7	4	1*

\*These figures include importations.

This table takes into account new records numbering no less than 26. It will be seen from the above that Glamorgan is the only county that has been at all systematically worked for Longicorns. Denbigh is a poor "runner-up", and the other counties have so far produced but very few between them; this is, of course, largely due to their not having been more thoroughly worked for the group. There is still a complete absence of captures from Anglesey and Flint (if we exclude from the former *Pyrrhidium sanguineum*, L., which is not a British insect). It is rather remarkable that Flint, so accessible from the Cheshire boundary, should have failed to attract any specialists in these beetles.

## DISTRIBUTIONAL DATA.

(New county records are marked with a dagger [†].)

## PRIONIDAE.

*Prionus coriarius*, L.—Denbigh (DB): Llangollen; Glamorgan (GM): Crwmllyn Bog, Neath, Swansea.

## CERAMBYCIDAE.

*Criocephalus rusticus*, L.—An imported specimen, marked "Wales", but without further details in coll. Brit. Mus.

*C. ferus*, Muls.—GM: Candleston Castle, Newton Porthcawl.

*Gracilia minuta*, F.—GM: Penarth.

*Rhagium bifasciatum* F.—Cardigan (CD)†: Aberystwyth, larvae and imagines in an old post on the Golf Course, 15.iv.1941; flying about the town, 7.vi.1942; Penglais Hill, on old posts, 28.v.1944; Caernarvon (CR)†: on the slopes of Snowdon; GM: Castell Coch, Swansea; Merioneth (MN)†; Aberdovey, in Scots pine, 24.iv.1946;

Pembroke (PB)†: Cannaston Woods, Tenby and district; Radnor (RA)†: Llandridnod Wells, 7.vi.1906 (E. A. Elliott, in coll. A. E. Moon).

*R. bifasciatum*, F., a. *unifasciatum*, Muls.—CD: Aberystwyth.

*R. mordax*, Deg.—CD†: Devil's Bridge, under bark of a fallen tree, 6.v.1944; Llyfnant Valley, in flight, 17.vi.1944; CR†: Snowdon; GM: Castell Coch, Crwmlyn Bog, near Swansea; Montgomery (MG)†: Mackynlleth, locally common in woods, vi.1939; PB†: Cannaston Woods, Tenby and neighbourhood; RA: Radnor Forest.

*R. inquisitor*, L.—GM: Llandough, imported specimens only.

*Stenocorus meridianus*, L.—GM: Castell Coch (including the ab. *chrysogaster*, Schrk.), Porthkerry, Sketty, near Swansea.

*Grammoptera ruficornis*, F.—CR: Aber-gwyn-gregan, Bettws-y-Coed, Llandudno, Snowdon; DB†: Colwyn Bay, several from hawthorn blossom; GM: Cardiff, Castell Coch, Swansea; PB†: Cannaston Woods, Cresselly, Mynachlogddu, Saundersfoot, Tenby, common; RA†: Llandridnod Wells, 5.vi.1906 (E. A. Elliott, in coll. A. E. Moon).

*Alosterna tabacicolor*, Deg.—CR†: Llandudno, in the Sidebotham collection at Manchester Museum; DB†: Llangollen, a note of its occurrence there in the T. Morley MS., Manchester University Library; GM: Porthkerry.

*Leptura livida*, F.—GM: Swansea.

*L. fulva*, Deg.—GM: Penllrgaer, Swansea.

*Judolia cerambyciformis*, Schrk.—CD: Aberffrwd, Aberystwyth, on *Spiraea*; Cwm Malws, Llyfnant Valley, 29.v.1943; Nant Eos, 12.vi.1943, in flight; CR: Bettws-y-Coed; DB: Llangollen; GM: Cardiff, Castell Coch, Swansea; MG†: Berriew, 14.vi.1938, Machynlleth, common; Welshpool, a few; RA†: Llandridnod Wells, 13.vi.1906 (E. A. Elliott, in coll. A. E. Moon).

*Strangalia aurulenta*, F.—GM: Briton Ferry, Swansea, Wych Tree Bridge.

*S. quadrifasciata*, L.—GM: Castell Coch, Pontneddfechan, near Sketty, Swansea; Llyn Cwmbychan.

*S. maculata*, Poda.—CD†: Llangorwen, 24.vi.1945; CR: Roe Valley, Snowdon; GM: Castell Coch, Llandaff, Sketty Burrows, Swansea; MN†: Fairbourne; PB†: Cannaston Woods, Cresselly, Mynachlogddu, Saundersfoot, Tenby.

*S. melanura*, L.—GM: Castell Coch, Swansea.

*S. nigra*, L.—GM: Swansea.

*Aromia moschata*, L.—DB†: Llanbedr, on old willow by the river, viii.1910; GM: Cardiff, Crwmlyn Bog, Llandaff, Penllrgaer, Swansea; MN: near Barmouth.

*Phymatodes testaceus*, L.—GM: Neath.

*P. alni*, L.—DB: Llangollen.

*Callidium violaceum*, L.—GM: Cardiff.

*Hylotrupes bajulus*, L.—GM: Swansea.

*Clytus arietis*, L.—CD†: Aberystwyth, very common in the town, 5.vii.1941, 28.v.1944, v.1945; CR: Caernarvon; DB: Llangollen; MN: Dolgelly, Fairbourne; PB†: Cannaston Woods, Tenby.

*Anaclyptus mysticus*, L.—DB: Llangollen; MG: locality not known.



## LAMIIDAE.

- Lamia textor*, L.—MN: Barmouth, Harlech, Llyn Cwmbychan.  
*Pogonocherus hispidulus*, Pill.—DB: Llangollen; GM: Llandaff, Swansea; PB†: Nevern.  
*P. hispidus*, L.—DB: Llangollen; GM: Castell Coch, Swansea.  
*Leiopus nebulosus*, L.—Brecon (BR): Tallyllyn; DB: Llangollen; GM: Castell Coch, Kenfig, Old Cogan, Porthkerry, Swansea; MG†: Machynlleth, on the wing, 17.vi.1944; MN†: Dolgelly, vi.1882 (ex coll. Henry, in coll. A. E. Moon); PB†: Cannaston Woods.  
*Acanthocinus aedilis*, L.—Caermarthen (CM)†: Caermarthen, 1937; GM: Cardiff, Danygraig, Swansea. These are all importations in pit props, etc.  
*Saperda scalaris*, L.—CD: Einion Valley.  
*Tetrops praeusta*, L.—GM: Llandaff; MN†: Aberdovey, viii.1934 (in coll. E. F. Gilmour).  
*Stenostola ferrea*, Schrk.—MN: Barmouth.

The following correspondents have very kindly forwarded records from, and lists of their captures in Wales, and the opportunity is taken to thank them for their information:—Campbell-Taylor, J. E.; Collins, G. B.; Duffy, E. A. J.; Gilmour, E. F.; Hallett, H. M.; Moon, A. E.; Morley, C.; Stretton, G. R.; and Wilding, R.

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## REFLECTIONS ON " SPOT " ABERRATIONS IN LYCAENIDAE.

By P. SIVITER SMITH, F.R.E.S.

(Plate XV.)

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There are several types of variation in the spots on the upper and underside of the genus *Lycaena* and in particular among the " Coppers."

I have prepared a plate that appears opposite. This was suggested to me by Mr Fincham Turner asking me to photograph his splendid aberration of *L. phlaeas*, which is shown in figures 1 (underside) and 2 (upperside). Having taken the photographs, I thought of other specimens and figures showing similar and different forms of extended spots and I now include them for examination.

The spots on the upper and undersides of " Coppers " show different forms of variation. These are

1. Reduction in size.
2. Increase in size.
3. Elongation inwards to the base.
4. Elongation outwards to the outer margin.

Those are, of course, only the four chief forms of variation the spots follow, but they sometimes combine in various forms together, giving such effects as partial and full coalescence, reduction in size with slight elongation and so on. However, for practical purposes the main divisions of types of variation are as stated. What is interesting in this question of " spot variation " is not the manner in which those types of variation combine, but the way in which they remain separate and distinct. Knowing how extremely variable are most species of " Coppers," particularly as regard " spot variation," what I want to draw attention to is the somewhat unexpected lack of affinities in the majority of specimens that occur.

Dealing in particular with the specimens figured on Plate XV, Nos. 1 and 2 show an aberration of *L. phlaeas* caught by Mr J. Fincham Turner at Lulworth Cove, in August 1939, being respectively under and uppersides. If one were shown the underside of this specimen, the natural reaction would be to anticipate that the spots on the upperside would be similarly extended considerably in approximately the same manner. However, on the contrary, the upperside spots show much more than usual a tendency to reduction and disappearance. True, the spots





1



2



3



4



5



6



7



13



8



14



9



15



10



16



11



17



12



18





are somewhat elongated but to nothing like the extent of those on the underside. I find such a "reversal" of variation on the two wing surfaces interesting.

What is equally interesting is a specimen that I possess of *L. dispar* f. *rutilus* var. *radiata*, Oberth., caught near Berlin on 8th July 1914, which is shown in No. 3 (upperside) and No. 6 (underside). Unfortunately this fine variety has been badly damaged on the left hindwing at some time, and repaired as can be seen in the plate. Comparison of this specimen with Mr Fincham Turner's *phlaeas* will show a very striking similarity. There is substantial elongation on the underside spots, whereas on the upperside they tend much more to reduction, although still being somewhat elongated, almost as though the excess of black pigment on the underside has been provided at the expense of the corresponding spots on the upperside.

Now it should be noted that Figures 1, 2, 3 and 6 show an extension of the black spots from their normal positions outwards towards the outer margin; even in the case of Fig. 6, one has the impression that it is the discal spot which has extended outwards rather than the sub-terminal spots having extended inwards towards the base.

The other form of extension—inwards towards the base—is shown by Figs. 4 (underside) and 5 (upperside), these being two good examples from my collection of var. *extensa-conjuncta*, Tutt. of *L. phlaeas*, subsp. *hypophlaeas*, Bdv., from N. America. It will be noticed that the spots do not extend at all from their normal position towards the outer margin, but only inwards towards the base; this is quite the opposite effect to that shown by Figs. 1, 2, 3, and 6.

Also note that in the case of Figs. 4 and 5, both the upper and underside extensions in the back spots do coincide fairly closely. In my own collection I notice that in the majority of instances such extensions of spots are not noticeably apparent on the opposite wing-surface; those that are extended on the upperside are frequently normal beneath and vice-versa. It is not always so, of course, but what causes me surprise is that they do not usually coincide, whereas I would have expected the spots on the two wing surfaces to follow similar paths in the majority of cases. I realise that there is probably no valid reason why they should do so, but, nevertheless, I think collectors would be surprised if they examined their series and found the numbers of specimens where the two wing surfaces differ considerably in the direction described. Data on this point would be interesting.

The remainder of the plate (with the dark background) is a reproduction of Plate X, from *Lambillionea*, 25th October 1931, kindly loaned me by Mr Castle Russell. I have reproduced this since Fig. 15 is an underside aberration almost as fine as Mr Fincham Turner's capture and the two specimens are almost identical examples of this rare form of variation. In *Lambillionea* the specimen is named f. *antico-radiata*, Courv., but unfortunately there is no reference to the appearance of the upperside. It was caught near Hamburg.

The remaining examples on the plate are described in *Lambillionea* as follows:

7. *H. hippothoe*, L., ♂, f. *radiata*, Courv.
8. *H. hippothoe*, L., ♂, f. *sinistro-posticoradiata*, Courv.

9. *H. hippothöe*, L., ♂, f. *dextro-paucipuncta-sinistroradiata*, Courv.
10. *Turanana* (*Lycaena*) *baton*, Bergstr., f. *limbojuncta*, Courv.
11. *Lycaeides* (*Plebeius*) *argus*, L., f. *parallela*, Courv.
12. *Lycaeides* (*Plebeius*) *argus*, L., trans ad formam *privatissima*, Courv.
13. *H. hippothöe*, L., ♀, f. *radiata*, Courv.
14. *H. hippothöe*, L., ♀, f. *radiata*, Courv.
16. *H. tityrus*, Poda (*dorilis*, Hufn.), f. *crassipuncta*, Courv.
17. *Polyommatus* (*Lycaena*) *tithonus*, Hbn. (*eros*, O.), trans ad formam *parallela*, Courv.
18. *Lycaeides* (*Plebeius*) *glandon*, de Pr. (*rustica*, Edw., *orbitulus*, Esp. (nec de Prun.)).

Of these the following show "spot extension" outwards to the outer margin—7, 8, 9, 13, 14. The following show the opposite, i.e., inwards extension—11, 16, 17. As I am chiefly pointing to extended spot variations I shall not touch on the other aspects of variation shown by the plate. The same forms of spot variation are found in some species of "Blues," but I have little idea of the comparative frequency of the inward as against the outward spot extensions—in the "Coppers" the outward type of extension is much rarer than the inward type.

This is only intended as a brief illustrated note that may be of some general interest and is not put forward in any way as being exhaustive. It might, however, give rise to some discussion and provide me with additional facts or theories. I hope from time to time to give other illustrations of a similar type whilst gathering material for a more comprehensive survey.

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## THE "SIESTA" IN ANTS OF THE GENUS *MESSOR*. HYM. FORMICIDAE.

By W. PICKLES, F.R.E.S.

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In a previous "Note" (see *Ent. Rec.*, LVII: 100) mention was made of the resting period which occurs about the middle of the day with ants of the genus *Messor* in Algeria. This was a period of the day when they were not abroad foraging and it coincided roughly with the "Siesta" observed by the native populations there during the heat of the summer. It was felt that more information on the subject might be of interest. The following account is a record of data collected whilst making observations on the ecology of ants of the genus *Messor* and in particular *Messor barbarus*, L. *barbarus* during the summer and autumn months of the year 1943 on a waste piece of ground on a hill-side at Souk Ahras, in Algeria.

It was noticed that during the summer months the ants belonging to this species were most active harvesting the grass inflorescence, but that during the heat of the day they were not abroad foraging. They appeared to have a "Siesta" in that they remained in their nest during the heat of the day. They were rarely seen abroad in the hot sun between 2 p.m. and 5 p.m. (D.B.S.T.) (i.e., 12 noon and 3 p.m., G.M.T.), and although it was impossible to make observations in the







*del P. Sireter Smith.*

A NECESSITY OF THE PRESENT TIMES.

mornings owing to the pressure of work, it seems feasible to assume that they would commence their "Siesta" two hours or so before noon (G.M.T.). On several occasions these ants were observed to issue from their nests at 4.30 p.m. (D.B.S.T.). Invariably during the summer months this species of ant was again actively foraging by 6 p.m. (D.B.S.T.). Instances of the times of issuing from the nests are (from nest No. 16) on 1st August 1943 when ants came streaming out of the nest at 6 p.m. and by 6.15 p.m. they had reached a point 36 ft. from it; 1st September 1943 when ants from another nest (E) were just issuing from their nest at 8.20 p.m. Yet another instance was at another nest (No. 11) when at 7.20 p.m. on 18th September 1943 ants were just emerging after their "Siesta."

It is not quite clear whether this "Siesta" is the result of the heat or whether it is to avoid the brilliant light of the sun. The latter assumption seems to be indicated by the following factors. At 3 p.m. on 22nd June 1943 the area was visited and ants of nests of the genus *Messor* were about and actively foraging. This particular day was both cool and cloudy (with fine rain at intervals). There were several contributory factors on this day and so the evidence is not so clear as on other occasions, notably 15th and 22nd August 1943, when specimens of *M. b. barbarus* were actively working on the "midden" and about the mouths of one of the nests at 3 p.m., even though the sun was out and it was a hot day. At this time of the day the midden of this nest was in the shade of a small thorn bush which was about 2 ft. 6 in. high. These ants were working in the shade of the bush but they did not venture far from it. This would appear to indicate that the "Siesta" is not instinctive, but is governed either by the heat of the sun or by the light from that luminary, or possibly by both. In September the ants were abroad earlier in the day after the "Siesta" than was the case in July and August. By 2nd October 1943 the ants from one of the nests were abroad foraging on a clear sunny day (with cool breeze from the North) at 3 p.m. (B.S.T.—2 p.m. G.M.T.) The length of the day was considerably shorter at this time of the year than in July and August so that all these factors may possibly be contributory to the change in the time and the duration of the "Siesta."

All times given above are Double British Summer Time (D.B.S.T.) except where otherwise stated.

I wish to thank Mr H. St J. K. Donisthorpe for kindly naming the ants.

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### GATE MADE OF RIDDLED WOOD.

By P. SIVITER SMITH, F.R.E.S.

(Plate XVI.)

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I thought it might interest your readers to see two photographs I took some years ago of a gate. This was above Mawgan Porth, near Newquay, N. Cornwall, and I took a general view of it and also a closer view of a portion of it. Apparently it had been made of planks cut up from a trunk or branch already well riddled by *Urocerus* (*Sirex*) *gigas*, L. It is not often, I imagine, that wood so damaged is put to good use.

21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.



## COLLECTING NOTES.

"CANNIBALS."—I was glad to see in last month's *Ent. Record* that Mr P. B. M. Allan agrees with me that the larva of *C. trapezina* does not feed upon its own kind, but, after agreeing on this, he proceeds to suggest in the later paragraphs that my failure to breed more than 82 per cent. in any year, and as little as perhaps 50 per cent. in other years, suggests that they, nevertheless, do eat each other. Surely in this he contradicts himself.

In doing so, he suggests that, cannibals apart, he would expect 100 per cent. emergence for wild taken larvae.

But what of "stung" larvae, victims of parasitic flies of one group or another, sickly larvae when taken (often quite numerous), diseases which occur in nature as well as in the breeding cage, diseases due to the necessarily unnatural conditions of cage feeding, loss from accident, loss from unsuitable food due to weather, harmless in the wild, fatal in the cages.

Having, over a considerable period of years, watched all the various species of larva that I have reared or attempted to rear, both in daylight and by artificial light at night, I am convinced that many species dubbed "cannibal" only become cannibalistic when placed in unnatural circumstances, and that while both *C. trapezina* and *S. satelitia* will eat other larvae and occasionally under special circumstances devour their own kind, the last is an occasional, not a regular, trait.

No doubt it is not safe to conclude that larvae in cages will act as in nature, but, nevertheless, I have learned more about the habits of species by watching them, in my cages, than all the "hints" that have been published were able to teach me, and in quite a number of cases this knowledge as to the behaviour of larvae in the cages has enabled me to find them in nature quite freely, and to prove that many a supposedly scarce species are plentiful enough when you know what you are looking for and where to look for it.—A. J. WIGHTMAN, Pulborough.

ORNITHOMYIA AVICULARIA, L., ON JAYS.—Edwards, Oldroyd and Smart in "British Bloodsucking Flies" (1939) quote a number of bird-hosts of this species, but do not specifically mention jays.

Whilst on holiday during the earlier part of June this year, in the New Forest, I learned from my friend, Mr F. Faulkner, of Shobley, that he had often seen "greenish flies that ran sideways" on the bodies of jays, which the Forest keepers have shot as "vermin." Subsequently, at my request, he brought me, on 13.vi.46, the bodies of eight freshly-shot jays, nearly all young birds, which he had wrapped tightly in cloth as soon as they were picked up. These yielded three specimens, one from an old bird, and two from young ones, which proved to be, as I had anticipated, *O. avicularia*, L. All the birds were shot in the immediate vicinity of Linford and Shobley.—Lt. C. N. COLYER (F.R.E.S.), 8 Canning Court, London, N.22.

THE HAMPSTEAD EYE.—In Volume LV of this Journal (1943) at pp. 49, 65 and 76 some interesting notes on this mythical species were printed, in which it was shown that the insect was probably *Precis (Junonia) villida*, Fab. Reading some old entomological magazines

recently I came across the following, by J. C. Dale of Glanville's Wootton, in *The Weekly Entomologist* of 4th April 1863 (vol. 2, No. 8, p. 61):—" *Papilio Vellida*, Fab., is figured by Petiver, who says it was taken at Hampstead by Mr Albin, and is also given by Haworth, who did not know the insect otherwise than in Petiver, and fancied it might be a hybrid. I suggested that as *P. Vellida* was found in the Isle of Amsterdam and also in Australia (I have specimens, too), which places were visited by Sir Joseph Banks and Dr Solander, the latter gentleman, living at Hampstead, might, as on his own showing, have been said, by a misunderstanding, to have taken it at Hampstead."—P. B. M. ALLAN.

THE PREY OF *MISUMENA CALYCINA* (ARACH., THOMISIDAE).—A female of the Spider, *Misumena calycina*, Linn., found on Nettle, was of a beautiful pale green colour. She was placed on the flower sprays of *Pyracantha gibsii* on 19th May, and by the following afternoon had "paled" to a creamy white, perfectly harmonizing with the flowers. As she seemed to be quite settled down, I kept her under close observation, during the following days, with a view to noting the prey taken. (No prey was offered at any time.) The following results were obtained:—

- May 20—One *Stomoxys calcitrans*.
- „ 21—Two honey bees, *Apis mellifera*.
- „ 22—Nil.
- „ 23—One *Calliphora erythrocephala*. One *Stomoxys calcitrans*.
- „ 24—Nil. Rain.
- „ 25—On two occasions *Empis tessellata* was taken and killed, but both were dropped, uneaten. Later, *Geosargus cuprarius* was taken and retained.
- „ 26 and 27—Nil. Rain.
- „ 28—A male appeared, and remained with her.
- „ 29, 30 and 31—No prey taken. Rainy.
- June 1—One *Empis tessellata* taken and eaten, followed by one *Rhingia macrocephala*.
- „ 2—Nil.
- „ 3—One *Empis tessellata*.
- „ 4—One *Rhingia macrocephala*. One *Tipula* sp., too mauled to be identified.
- „ 5—She disappeared, possibly to attend to family cares, although she was not actually seen to mate.

The male was not seen to take any food, and spent most of his time in the background, but at times he was seen to run "crab-fashion" around the female, at the same time violently agitating his palps and first pair of legs.

On several occasions foraging Ants (*Formica rufa*) were seen to walk over the spider, whilst she was feeding, but she never moved, or took the slightest notice. The ants were not seen to interfere with her prey.

During the whole period, the spider only took prey during sunshine. When there was no sunshine she tucked herself away behind the flowers, but immediately the sun came out she would reappear, and assume the typical Thomisid stance, with the first two pair of legs raised in readi-



ness to strike at any fly or bee which came near.—A. H. TURNER, Hatch Beauchamp, Taunton.

WHAT IS THE RACE OF *PAPILIO MACHAON* FOUND IN THE NORTH WEST OF FRANCE?—Captain Dannreuther, referring to the *Papilio machaon*, which is on rare occasions met with in the counties near the Southern coast of England, wishes to know to what particular race it belongs. These specimens come over from Western France. He is provisionally calling it race *gorganus*, Fruh., the colonists of the mountain ranges of Central Europe and spreading to Eastern Europe and possibly into similar areas in Asia Minor (?). It will usually be single brooded until it reaches a more genial climate like the Italian lake areas of Switzerland, where the 2nd generation occurs and is known as “trans ad” *sphryoides*, Vrtý., or *aestivalis*, Shelj. In the higher Alpine regions above it is known as race *alpina*, Vrtý. In the lower areas of S. Eastern Europe *machaon* exists in two generations definitely under the name *bigenerata*, Vrtý., with 2nd generation *aestivalis*, Shelj. What we want to know is particulars of the distribution of *machaon* in N.W. France. There are two generations in the lower Rhone Valley Swiss, in the Rhine Valley, Badon area, in the Belgian Vorges area and also in Central France. All these doubtless are *r. gorganus*. They occur April-May and late July-August. The (1) *bigenerata*, Vrtý., with its (2) *aestivalis*, Shelj., are said to distribute from the E. Europe area in an E. and S.E. direction parallel to the more elevated Central European *gorganus* direction. Both have the *aestivalis*, Shelj., as 2nd generation (*bigenerata* is an unfortunate name as it confounds the facts). Observers resident in the Plateau of Langres, the Paris area, Fontainebleau, Normandy and the West Central country N. of Bordeaux only can give us correct information.—HY. J. T.

SPANIA NIGRA, MG. [DIPT., RHAGIONIDAE] IN HANTS.—When Verrall published his *British Flies*, Vol. 5, in 1909, he was only able to record this species from one locality in England, namely, Tarrington, Herefordshire, “where Col. Yerbury found the males common on *Cornus sanguinea*.” Since then it has been found in Cambs. and Notts. I find that I have two males taken on 5th June 1938, near Burley in the New Forest, Hants. Unfortunately no note of the habitat was made at the time but they were captured when collecting in a fairly damp area on the occasion of the excursion of the Society for British Entomology during its 4th annual Congress.—L. PARMENTER, F.R.E.S., 94 Fairlands Avenue, Thornton Heath, Surrey, 26.8.46.

THE HOVERING OF A STRATIOMYID [DIPT.].—Verrall, in *British Flies*, 1909, p. 55, stated, when dealing with the *Stratiomyidae*, that “very few, if any, species show any marked powers of flight, and none are known to hover.” He defined “hovering” in a footnote on the same page: “I consider the word ‘hover’ to indicate the apparently motionless poise in the air of an individual specimen when the wings are rapidly vibrating.” It was therefore interesting to find that two small flies which hovered poised in one spot at about 10 feet over a track between oak trees at Limpsfield Common, Surrey, on 21st July 1946, were none other than male *Pachygaster leachii*, Curtis. Incidentally I believe it has not been taken previously in Surrey.—L. PARMENTER, F.R.E.S., 94 Fairlands Avenue, Thornton Heath, Surrey, 20.8.46.



## CURRENT NOTES.

THE Jr. of the London Nat. Hist. Socy. (*The London Naturalist*) for 1945 besides the Report of the normal doings of the Society contains several items of more than ordinary interest for its members. The first is a detailed account by J. E. Lousley of the Life and Work of William Curtis (1746-99), a famous horticulturist and naturalist. The author gives full and interesting details of the Botanical work of Curtis. To him we owe the commencement of the *Botanical Magazine*, which was to give accurate coloured figures and descriptions of all the best non-British plants. This was an event of outstanding importance and the reception and advancement it received from horticulturists has been phenomenal, and as a register of aught that is new, attractive and interesting it has continued to the present time. Perhaps to Entomologists the most attractive article is the extremely fine "Appreciation of L. B. Prout and his Work," by E. A. Cockayne. This summary of Prout's outstanding merit needs to be read, but we will quote the doctor's description of Prout's views and action in questions of Nomenclature, views which, personally, we endorse to the full. Let there be no "um and a (h)" over names. Dr Cockayne wrote:—"Prout's views on Nomenclature were uncompromising and he insisted on the absolute inviolability of a name as first published. Even when a name was obviously misspelt, whether it was due to the author's ignorance, or to a printer's error, he said it must remain unaltered. For instance, he used the original spelling of *Perizoma bifasciata* and *Xanthorhoe quadrifasciata*, although the *s* of fascia was omitted in the first and the *c* in the second. To make a specific name agree in gender with the generic name, and change it if it was placed in a genus of different gender, was, in his opinion, indefensible; for example, when *pinaria* was removed from *Fidonia* to *Bupalus* it remained *pinaria* and did not become *pinarius*. He said it was illogical to allow names, which are obviously mere combinations of letters with no meaning, such as *Datana*, of Walker, and yet to reject or alter others because their spelling does not indicate their meaning with sufficient accuracy. His definite opinions and consistent action did much to stabilize the Nomenclature of the *Geometridae*."

WE have received a Separatum of Notes on the 3 *Colias*, *C. croceus*, *C. electo* and *C. fieldii*, by B. J. Lempke, *Tijds. v. Ent.*, 1944 (46), in which the critical portions of the structures are carefully described and figured. Statements of the opinions of other workers are given both for and against the opinion that they can be considered three true species. They are closely allied, no doubt, as Hemming says, but whether "species" or not matters little. P.S.—What is a species?

Several Separates from *Psyche* (Amer.) on the "Nearctic Forms of Plebeine *Lycaenidae*" by V. Nabokov have been sent us. In the first article (III, 1944) the author describes the abundance of his material of some half-a-dozen *Lycaeides* (*Plebiinae*) beginning with *argyrognomon* (Nearctic and Palaearctic are practically the same) and discusses them from all points of view without overweighting descriptions with structural details. In the next article (II, 1945), after discussing the geni-

talia from a more or less evolutionary point of view, he draws up detailed comparative descriptions of the pattern of colour of lines, spots and combines. Eight categories of characters are detailed and compared: (1) Size and Shape; (2) Ground; (3) Cyanic Overlay; (4) Vadosal Elements; (5) Scintillant Elements; (6) Hair Scales (Androconial Scales); (7) Terminal submarkings of underside; (8) Maculation of Underside in much detail. In his third paper (long) he has brought in Neotropical material, but only a very small amount, on which he goes off strongly on the genitalic quest, only giving slight attention here and there to the wing pattern and colour.

WE have received two volumes of Reports from Portici, Southern Italy, containing memoirs on Entomological Investigations on the biological economy of the insects which do damage to the various crops in that part of the country. (1) *The Bollettino Lab. di Zool. General and Agraria*, Vol. xxxi, 368 pp. (1939-41). The articles are spread over most Orders of the Insecta. In Coleoptera 3, Orthoptera 3, Diptera 2, Hymenoptera 2, Lepidoptera 1, Spiders 1, Scorpions 1, etc. Most of them are well illustrated where needed, life history and biological details are dealt with in much detail in most species considered. A special Lepidopteron dealt with is *Aegeria typhiaeformis*, Bork., an Aegeriid (Sesiid) and a devastating Pest of the Apple-tree. The account takes up 46 pp., has 34 figs. (some of which comprise a dozen items). The Imago is figured with its head structure, its body parts, wing veins, abdominal appendages, ovipositor; also the ovum, the new born and mature larva with numerous figures of structures. The chrysalis is equally well described and with abundantly figured details. This is followed by its Geographical Distribution and a detailed Life-history with numerous figures of the ravages of the larva compared with attacks by other larvae such as *Z. pyri*. Then follow similar accounts of the natural predators on the Aegeriid: (1) *Bracon triangularis* (Hym.); *Pimpla nucum* (Ichneumon); *Dibrachys affinis* (Chalcid); *Leskia aurea* (Dip.); and conclusion with a Bibliography. (2) Of the other series, Vol. v, 328 pp., contains 14 similar memoirs of insects of economic importance, 7 species of Coleoptera, including *Balaninus nucum*, *B. elephas*, *Sitona lineatus*, *Belonuchus formosus*, etc., and the Lepidopteron, *Operophtera brumata*, 3 micro species, etc. A figure of ♂ *brumata* is given and the two ♀ forms, wingless and semi-wingless are figured. All are illustrated in the text where needed.

THE AMATEUR ENTOMOLOGICAL SOCIETY.—Our younger readers will do well to pay a visit to the Special Exhibition of specimens and apparatus to be held on Saturday, 28th September, 2-5 p.m., at the Buckingham Gate Central School, Wilfred Street, London, S.W.1 (near Victoria Stations). This Annual Exhibition is generally made very attractive with novel home-made apparatus and appliances.

VOL. III, *Brit. Noctuae Supplement* will shortly finish the regular Text, but there remains a mass of new material to add to the records in Vols. I, II and III, so that Vol. IV cannot be commenced for a time. Will anyone who can point out forms not yet noted, or errors and amendments, kindly do so as soon as possible.—HY. J. T.



## EXCHANGES.

- Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.
- Wanted**—American Hesperilidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.
- Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.
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- Wanted**.—Males of *Morpha menelaus*, *M. aidius*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.
- Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.
- Wanted** for purchase or exchange, pupae of *Smerinthus ocellatus*.—E. S. A. Baynes, F.R.E.S., Monkshatch Cottage, Compton Guildford.
- Wanted**.—The two volumes (bound or in parts) of the second "Deuxieme Partie Geometres only of Culot's Noctuae et Geometres d'Europe."—Brig.-Genl. B. H. Cooke, C.M.G., C.B.E., D.S.O., F.R.E.S., 86 Osborne Road, Windsor.
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- Wanted**.—*Entomologist's Record*, 1911-37, bound or unbound. Offered:—Various volumes of *The Entomologist*.—B. O. C. Gardiner, "The Red House," River-in-Dover, Kent.
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**SYRPHUS ERICARUM SP. N. ♂ ♀ (DIPTERA, SYRPHIDAE).**

By J. E. COLLIN, F.R.E.S.

A species of the *compositarum*-group resembling in both sexes *S. umbellatarum*, F., and *S. lasiophthalmus*, Ztt., in having a distinctly shining thorax, and in the female in having a sharp contrast between the shining and dusted areas on frons, differing in both sexes in the size and shape of yellow abdominal markings, and in other respects as stated below.

♂. Less easily distinguished from *umbellatarum* than in female, but face more extensively dark haired, notably some dark hairs on jowls below eyes; these jowls not so obviously yellow; thoracic disc universally covered with microscopic dust (though still obviously shining), with many black hairs on disc, and some on pleurae (notably on mesopleurae). Legs (especially middle tibiae) more extensively darkened; front and middle femora with more numerous black bristly hairs behind, and some black hairs on hind coxae. Basal yellow abdominal spots (on second tergite) smaller and widely distant from side margin. Hairs on paralobes (or side lamellae) of genitalia black, and some bristly hairs towards end of fourth abdominal sternite, at sides, also black.

Resembling *lasiophthalmus* in many of these characters, but in that species the eyes are sparsely but distinctly hairy, scutellum extensively pale haired, and the yellow markings on second abdominal tergite are larger and more transversely elongate, while the other yellow markings often extend to, or go over the side margin of abdomen.

♀. Compared with *umbellatarum* the facial black stripe is rather wider and the lateral extensions (on mouthedge) more obvious and including the vibrissal angles. No black hairs on jowls in either species. Frons similarly marked in both species, the shining black areas above antennae and across upper part not dusted.

Thorax obviously shining, though distinctly dusted at side margins, notably in notopleural and prescutellar areas; rest of disc not so entirely devoid of microscopic dust as in *umbellatarum*, though still very obviously less dulled by such dust than in *compositarum*; pubescence partly black, especially near lateral margins, but pleurae entirely pale haired as in *umbellatarum*, and much dulled by dust. Scutellum often notably darkened about base, and more extensively black haired.

Abdomen rather more shining. Yellow markings similar in colour and shape, except that those on second tergite are smaller, especially laterally, where they fail to reach by some distance either the side margin, or base of the tergite; these markings also roughly triangular in shape with upper margin (or side) longest and straightest. Black bands on sternites varying much in intensity but apparently always larger than in *umbellatarum*. Whole of venter dulled by greyish dust.

Legs rather darker, especially middle femora less broadly yellow towards tip, and middle tibiae more extensively darkened; both front and middle femora with a row of black bristly hairs behind, often on more than apical half.

*S. lasiophthalmus* ♀ differs in having obvious hairs on eyes; paler hairs on sides of face, disc of thorax and scutellum; less conspicuously dusted greyish notopleural region of thorax; and particularly differs in

abdominal markings which are more orange-yellow in colour, and *all* always extend (even if sometimes only indistinctly) over side margins, while those on second tergite are completely different in shape, being long, narrow, transverse, markings, compared with the roughly triangular markings of *ericarum*. *S. lasiophthalmus* is, moreover, essentially a Spring species.

Length 9-11 mm.

I am indebted to Mr Philip Harwood for specimens of this species. He captured a number of females in the Strathspey district of Inverness-shire, in company with *S. compositarum*, in 1943, mainly in September, but with one specimen dated "vii.1943" and another "2.x.1943." These he sent to me in 1944, when I recognized them as an undescribed species. In 1945, in spite of the season being a bad one for *Syrphidae*, and his well-known interest in other Orders of Insects, Mr Harwood succeeded in taking two more females and four males. In the meantime Mr C. J. Wainwright, who had been told about the species, hunted for it when collecting in Scotland in 1945, without success, but upon returning home and going through his Collection came to the conclusion that a single male captured by him in Glen Shin (Sutherland) on 5th August 1936, which he had placed on one side as possibly a distinct species, might be a male of the species for which he had been hunting. This proved to be correct, his specimen being even more black-haired than typical males, some of the long bristly hairs on second abdominal sternite being black. It is, therefore, entirely due to these two enthusiastic collectors that this species has been discovered, and the publication of its distinctive features rendered possible. Specimens of both sexes taken at Aviemore, 20.viii.1945, may be considered to represent "types," these and other specimens having been generously added to my collection by their captor, Mr Philip Harwood.

The four species, *compositarum*, Verr., *labiatarum*, Verr., *umbellatarum*, F., and the new species *ericarum*, form a subgroup of very closely related species more easily distinguished in females than in males. Even the primary separation of the males of the first two as less shining, and the last two as more shining, being a comparative distinction, is not very definite until material in both opposing pairs is available for comparison. A microscopic distinction between the first two appears to have been overlooked; the eyes in *labiatarum* ♂ are more distinctly hairy than in *compositarum* ♂. The female of *labiatarum* has a more uniformly dusted frons than in *compositarum*, particularly on vertical half, and it is necessary to point out that the figure given in Verrall's *British Flies*, Vol. VIII, p. 416, is certainly misleading, and probably *not* a figure of a *labiatarum* head. On the abdomen the yellow abdominal markings are larger in *labiatarum* ♀ and those on second tergite almost always extend well over the side margins.

We now know that all four species occur north of the Grampians with *compositarum* predominating, because Wainwright has taken *umbellatarum* and *labiatarum*, and Harwood *labiatarum*, in that region, while there were a pair of *umbellatarum* in A. E. J. Carter's Collection taken on the south side of the Grampians. In the South of England *umbellatarum* would appear to predominate with *ericarum* at present unrecorded.



Some authors have considered the species of *Syrphus* resembling those in the above group in having no "beaded" or "ribbed" edge to the abdomen, as forming a phylogenetically distinct section, but this is a misconception of the nature of the difference, the "beaded" edge being merely a character of specialization which has been developed in several widely separated groups. As a matter of fact, indications of the development of this specialized character are to be found in the (*grossulariae*) group, said to be typical of those *without* "beaded" edges. Other suggested subdivisions of those species without "beaded" edges to the abdomen would bring the species allied to *compositarum* into a very vaguely characterized "subgenus" under the name of *Stenosyrphus*, Matsumura, but it would appear to be impossible to quote any but specific characters to distinguish this "subgenus" from *Melangyna*, Verr., which is certainly far more closely related to *Syrphus* than to *Melanostoma*.

---

### FRESH WOODS.

BY AN OLD MOTH-HUNTER.

---

"At last he rose, and twitch'd his Mantle blew:  
To-morrow to fresh Woods, and Pastures new."

*Lycidas*, 1645.

I'm sure it was *livornica*. We had forced our way through a jungle of willow-herb, chin-high, and all at once I saw, a little to my left, about ten feet away, a hawkmoth hovering at the purple blossom. Dusk had hardly fallen; the moth was larger and paler than *elpenor*, and it was the 24th of July. I moved cautiously towards the moth; but my movement altered the mosaic pattern of its vision, and it shot upwards like a jet-propelled plane which had designs on the stratosphere record. Almost straight up it went, over the tops of the oaks like the proverbial flash of lightning. I turned and looked at the companion who was close at my heels: he, too, had seen it. "*Not elpenor*," said I; "but what it was I don't know." Two days later a *livornica* was brought to me for identification: it had been netted while flying at larkspur, a mile or two away from the wood. Perhaps there had been a small immigration of the moth again this year.

The wood in which this occurred was *terra incognita* to me. It is little more than a mile from my house, but being devoted, in days of peace, to the rearing of pheasants, to be shot later by one who has small sympathy with moth-hunters, I had left it to solitude and the several keepers who patrolled the wood and cooped the birds. The war had abolished the keepers and also the surplus income of the pheasant-shooter; so Plugget's Wood lay open to my net and sugaring-tin. It was a warm July evening, when moths might be expected a-wing at flowers and, later, at rest on the sugar-patch; so two friends were collected and, well equipped, we proceeded to the wood. But before I tell you what happened in that wood I must discourse a little on the subject of fresh woods if not of pastures new.

It was only a month or two since I had visited, entomologically, a largish wood some miles from my home which also had once been devoted



to the cult of the pheasant. And let me say at once that it was one of the pleasantest woods I have ever explored. A good deal of clearing had been done, and flowering plants were springing up where previously dense shade forbade all herbage other than twayblade, and the lovely sweet-scented *Habenaria*—more common in this wood than I have seen it elsewhere. The young oaks proved profitable at once—*miniosa*, *ridens*, a cocoon of *bicolorana* (which we older men used to call *quercana*), and an assortment of Geometers. 'Tis true I drew blank at the aspens that bordered the rides; but these could wait until later in the year, when I should find them patronized by *ziczac*, *palpina*, *bifida*, *curtula*, *A. populi* and suchlike inhabitants of my part of the country. Sallows there were in plenty, and I remembered that *polychloros* had returned to the district after an absence of many years . . . *A. iris*, too, had occurred in the neighbourhood, years ago, and it was just possible—Yes, said I to myself, I must take a season ticket for this wood.

Once, happening to look at an ordnance map, I noticed a wood of some 250 acres a few miles away which I had not yet explored. Enquiries showed that it was on the estate of a notable pheasant-rearer; but, as luck would have it, he was a good friend of mine; so one day when I met him I told him that I intended to ransack Hollington Hall Wood. "Good," said he; "let me know if you find anything worth while. I'll tell the keepers you're going." So a few days later I proceeded to the wood. It contained *paphia*, *cydippe* and *sibylla*, and goodness knows what not; so when I had filled my boxes with larvae I drew my "Parson Greene" and got to work at the roots of an oak.

Presently I heard the sound of someone trying to walk through the wood with great delicacy of footstep. I glanced round and saw that a man was stealthily approaching from my rear, dodging from tree to tree. As he wore a rather nice-looking square-cut moleskin coat, with cord breeches and neat leggings, and had a gun under his arm, his precautions seemed a trifle superfluous. I continued digging and enjoyed the treat I was giving him—catching one of these darned rabbit-snarers red-handed . . . When at last he judged that it was impossible for me to escape he strode up rapidly and bent over me. "And what may you be doing here?" said he politely.

At this moment I disinterred an *A. aprilina*. I put it on the blade of the trowel and held it up for his inspection. He stared at it, a little nonplussed. "My very good friend your master," said I, "told me to find as many of these as I could—though happily he didn't specify *aprilina*." Velveteens knitted his brows, wondering what kind of a lunatic he had to deal with. Then suddenly a light dawned on him. "Oh!" said he; "you must be Mr A—— of M——!" I pled guilty, and he sat down beside me to watch. Presently I uncovered another *aprilina*, removed the dust from it, and deposited it in my box. "I suppose," said he, "you uses them bluddy things for bait."

Really, it was quite an effort to disillusion him. I wanted to tell him all sorts of interesting things about *aprilina* as baits for chub. But I am a fisherman as well as a moth-hunter, and the idea that I contemplated luring his master's trout to destruction by means of *aprilina* was not to be borne. We parted great friends; but I think he is still a little doubtful about *A. aprilina* . . .

To return to Plugget's Wood, where I saw what I believe to have been a veritable *livornica*. The moth gone, we ploughed on through the jungle towards a clearing where oaks stood invitingly, and as clouds were blowing up and dusk was now falling rapidly I forged ahead in order to get the sugar on before it was too dark to see. There were no paths in the wood apart from the main drive—or if there were they had been obliterated by the rose-bay—and once or twice, walking blindly through the dense pack of *Epilobium*, I stumbled into a runnel and narrowly escaped falling. I should have taken warning by this, but—I wanted to get the sugar on. A moment later, when I was out of sight of my companions, I suddenly trod on air and fell, and fell heavily, into a ditch which, I was afterwards told, was three feet deep. What exactly happened then I do not remember, for I was considerably shaken, but the pain in one leg was so severe that I cried out. It was a minute or two before I was found; for it was impossible in the gloom to see where I lay and the willow-herb had closed over my head. I was pulled out and stood upright, on one leg. It was a dreadful journey back through that pathless jungle, an arm round the neck of each companion, their arms about my waist; for at every step the willow-herb had to be trampled down lest we all three fell into another ditch. But the edge of the wood came in sight at last, and the waiting car, and so the old man was brought home and put to bed.

And now my field work is over, for this year at all events. So take warning by the Old Moth-Hunter, and when you explore fresh woods let your prospecting be done, in the first place, by day. And where *Epilobium angustifolium* holds the field, *watch your step*. Above all, do not go sugaring in fresh woods *alone*. For if I had been unaccompanied that night, there might have been a paragraph in this Journal beginning "We regret to announce . . ."

## DIPTERA BRED FROM FLOWER-HEADS OF COMPOSITAE.

By M. NIBLETT.

I have for several years examined flower-heads of the Compositae for insect larvae, and during 1945 examined some thousands of these. In them I found numerous larvae of Lepidoptera, Coleoptera and Diptera, but propose confining my remarks to the last Order.

*Napomyza lateralis*, Fln.—During July I found at Effingham Common, Worms Heath, and near Headley, flower-heads of *Matricaria inodora*, L., with yellowish puparia in the receptacle; they appeared to be attached to the inner surface with one end close to a hole, presumably prepared by the larva before pupation for the exit of the fly. A number of these flies emerged between 30.vii and 15.viii.45. Again in early September I found at Denbies, Dorking, a few flower-heads with whitish larvae in them; from these the flies emerged between 14.ix and 20.ix.45. It would appear that there is more than one brood a year.

*Pegohylemyia sonchi*, Hardy.—Among numerous flower-heads of *Sonchus arvensis*, L., examined near Headley on 2.viii.45, several were found to contain a single larva at the base of the seeds; these went into earth provided and one fly emerged 24.vi.46.



*Pegohylemyia jacobaeae*, Hardy.—During 1945 I made a large collection of flower-heads of *Senecio jacobaea*, L., from Riddlesdown, Ranmore Common and Farthing Down, but very few contained the larvae of this species; they were at the base of the seeds and left to pupate in earth, the flies emerging\* between 20.iv and 1.vii.46. I had previously bred this species from *S. erucifolius*, L., from Shalfleet, Isle of Wight and Epsom Common. The heads were collected in August and September.

*Heterostylus piliferus*, Zett.—Flower-heads of *Hieracium sabaudum*, L., from Boxhill in July, had several white larvae of this species in each; as the heads dried the larvae left them. Upon being placed on moist earth they burrowed into it with great rapidity; the flies emerged between 20.iv and 5.vi.46. In July 1945 I found near Headley, flower-heads of *Picris hieracioides*, L., with larvae of this species in them. These behaved in exactly the same manner and the flies emerged between 23.vi and 25.vii.46.

*Heterostylus atomarius*, Schnbl. nec Zett.—Flower-heads of *Hieracium vulgare*, Tausch., each containing a single white larva, were found at Epsom Downs and Ranmore Common in June; the larvae left the heads and pupated in earth, the flies emerging in April and May of the following year. I examined many flower-heads but found very few larvae.

*Heterostylus pratensis*, Mg.—*Leontodon hispidus*, L., is another plant of which I have examined many flower-heads with but meagre results. At Boxhill on 17.vii.45, several were found with the whitish larvae of this species in them at the base of the seeds; these went to earth and on 10.vi.46 two flies emerged.

*Palloptera umbellatarum*, Flin.—In September and October I was collecting galls of *Euribia stylata*, Fab., from flower-heads of *Cnicus lanceolatus*, Scop., when I noticed that there were numerous small, whitish larvae below the gall; further investigation showed that nearly every galled head had a number of these larvae in the same situation. I then opened numerous heads which had no gall in them; in only two cases did I observe any larvae in them. I placed the larvae I had disturbed on damp earth; this they entered fairly rapidly. The remaining heads were not opened and the larvae gradually left them, some, however, not before the beginning of November. Further galled heads examined in December contained no larvae but showed evidence of having been inhabited by them. Heads containing these larvae were found at Farthing Down, Fetcham Downs, Epsom Downs and Mickleham Downs. The flies emerged between 23.v and 31.v.46.

*Palloptera parallela*, Lw.—The Thistle, *Carlina vulgaris*, L., is a plant whose flower-heads I have frequently examined hopefully for larvae, but have met with little success. At Walton Heath on 21.ix.45, a head cut open showed that it contained numerous smallish, white, dipterous larvae, so a few more heads from plants in the near vicinity were gathered and the cut head was found to contain forty-two larvae among the seeds. These were placed on earth, which they entered with little hesitation; the remaining heads were placed in a jar and by 15.x.45 all the larvae had left them and were bunched together in a tangled mass; they were removed and placed in another jar containing damp earth. This they seemed very reluctant to enter, crawling up the







1



2



3



4



5



6

RIGHT HAND ELYTRA OF *CRIOCERIS ASPARAGI*, L., SHOWING  
PATTERN VARIATION.  $\times 15$ .

sides of the jar and bunching together on the underside of the cover; eventually all entered the earth with several occupying one burrow. The flies emerged freely between 12.v and 4.vi.46.

All these larvae appear to have power to resist low temperature, as three times during the winter they were frozen solid in the damp earth containing them. Mr J. C. Collin, to whom my thanks are due for the examination and identification of these flies, informs me that as far as he can trace, the life-history of the species of the genus *Heterostylus* has not previously been recorded.

*Ceriocera ceratocera*, Hend.—In early August 1945 I found near Headley some plants of *Centaurea scabiosa*, L., in the flower-heads of which were numerous typical Trypetid larvae at the base of the seeds; as the heads dried these larvae left them, and when placed on earth they entered it without any hesitation. This rather interested me as I had never before known flower-head feeding Trypetid larvae to do this, they always pupating in the head. I placed several larvae in a tube with seeds and pappus, the flower-heads being returned to their jar. Between 18.vi and 6.vii.46 a number of flies emerged from the larvae which had pupated in the earth, one from the larvae placed in the tube, only one had pupated, the remaining larvae having died; two flies also emerged from the flower-heads, obviously from larvae which remained there to pupate.

During the last fourteen years I have kept flower-heads of *C. scabiosa* to the number of some thousands, and during that period I have only bred a dozen *C. ceratocera* from them; if it is the general habit of this species for its larvae to leave the heads, it is easy to understand why so few flies have been bred from them. One does not usually collect the flower-heads too early so that the larvae may be as mature as possible before being removed from the growing plant. A great many of the species of Trypetids whose larvae overwinter in flower-heads have their larvae enclosed in a cocoon; this may be dense or quite slight, but the larvae of *ceratocera*, at least all those I have seen, make no attempt to provide any sort of cocoon; this may have some bearing on the larvae leaving the heads.

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## NOTES ON THE ASPARAGUS BEETLE (*CRIOCERIS ASPARAGI*, L.).

### PART I: VARIATION.

By BERNARD VERDCOURT.

(Plate XVII.)

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The starting of an asparagus bed in a garden at Boxmoor allowed the writer to make observations on large colonies of this insect. A close look-out was kept for the beetle since asparagus is widely cultivated in the neighbourhood. The beetle hibernates during the winter and may be taken under bark and similar places. The first one to be seen was on a lime tree twenty-five yards or so from the asparagus (30.iv.46). The asparagus did not attract beetles until the last week in May, when the plants were already of considerable size. The beetles arrived in many hundreds. In the case of established beds the young shoots are attacked early in the Spring and the beetle is therefore a



serious pest. Mating was observed and eggs were laid from the end of May until the beginning of July, although few adults were present during June and July. Larvae hatched out during the last two weeks in June and the majority were fully grown by the beginning of July, when very few eggs remained unhatched. By the second week in July no adults were present and larvae few. The asparagus was now in a very bad state and nothing remained of the leaves but the brown midrib. The new brood started to hatch out during the last week in July and became very numerous on the asparagus, on surrounding plants and in the soil. They remained on the plant in gradually diminishing numbers until October. Towards the end their interest in the asparagus began to dwindle and they were quite as common on all the neighbouring objects as they were on the asparagus. Mating was rare in the new brood.

Several hundred were collected and examined. The markings vary considerably. Several dozen specimens were sexed, but little relationship between sex and pattern was discovered. The chief variations observed are as follows:—

*Pronotum*—This may be entirely orange or more usually bears two or three blackish spots. Every phase between three spots and a V-shaped mark exists.

*Elytra*—The dark parts are black with a blue tinge, the spots cream and the outermost interstices orange. Six types of pattern were found and these are illustrated in the plate. Numbers 1-5 are merely phases in a continuous variation and intermediates exist. No intermediates were found, however, which linked number 6 with any of the rest and only one example of this variant was found. The percentages of the types present were found for two batches.

A.—Overwintered specimens collected in May; and

B.—Newly hatched specimens collected at the beginning of August.

A.

1 and 2.	3.	4.	5.
76.4%	20%	1.8%	1.82%

B.

1 and 2.	3.	4.	5.
75%	13.2%	7.35%	4.45%

A feature which was frequently noticed was the lack of bilateral symmetry in the pattern of many of the specimens. The elytra are often slightly different from one another. This is most obvious in individuals which are just bordering on types 3 to 5. Then sometimes one elytron will be of type 2 and the other of types 3-5. Although the effect is quite noticeable the actual additional area of black on the more heavily marked elytron is rarely more than 0.2 sq. mm.

### SOME OBSERVATIONS ON THE LIFE-CYCLE OF *L. QUERCUS*.

By T. D. FEARNEHOUGH.

I must commence by confessing that my knowledge of the "Oak Eggar" in parts of the country other than South Yorkshire and North Derbyshire is almost negligible. Nor do I really understand the some-

what vague distinguishing features ascribed to *quercus* and *callunae*. I am convinced, however, that the Oak Eggar, which inhabits the gritstone moors of South Yorkshire and North Derbyshire, is a single form with a varying life-cycle.

In these localities the Oak Eggar (*Lasiocampa quercus*, Linn.) is abundant and may be found in the perfect stage throughout July and the greater part of August. The covering herbage on the moors, apart from grasses, is heather and bilberry and it is these two plants which constitute the main food supply for the larvae. Bramble is often used as an incidental food-plant but this is usually available only along the borders of the moorlands. No doubt there are other plants which occupy minor rôles in the *quercus* menu.

The life-cycle of *quercus* on the moors being considered is variable, and seems to be largely dependent on the food-plant. The moth is normally on the wing from early July into August, declining in numbers during the latter month. It is most unusual to see specimens at any other time. The ova must therefore be deposited during this period, when they are dropped apparently indiscriminately among the heather areas or smaller bilberry patches.

It is, I believe, mainly upon the mere chance of being deposited amongst heather or amongst bilberry that the life-cycle of the future imago depends.

An egg dropped into a patch of bilberry has a good future. The larva feeds during the Autumn on the bilberry so long as the plant supplies leaves, and reaches a hibernation size of 1 to 2 inches. The bilberry begins to show leaves the following year in March or early April and provides succulent food, which gives the hibernated larva a flying start. It feeds up rapidly to full growth and pupates in late May or in June. Under favourable conditions a proportion of the early pupae produce moths the same year in August.

An important factor in the life-cycle of the bilberry-feeding larvae is position. The moorlands are crossed and bounded by gritstone walls, and along the lee sides of these the largest and most succulent bilberry patches are to be found. It is the larvae which have the shelter of the walls, together with the earliest supply of food, which reach maturity within one year.

The lot of a larva which spends its life in a heather patch is much harder. It seems to hibernate at a generally smaller size than its bilberry-feeding brother, and when the Spring comes it often has to wait till May before it can obtain a good meal of new heather shoots. The result is that when the bilberry-eating larva is spinning its cocoon the heather feeder is still only half-grown. The larvae feeding on heather do not pupate till late Summer, and the moths from these emerge the following July or August.

Obviously there are combinations of conditions, and no doubt many larvae obtain a mixed diet. It is, however, most striking to see the difference between the larvae feeding, in May, on bilberry, and those feeding on heather, on the same patch of moorland.

*Quercus* larvae are not great wanderers, and feed systematically. The presence of a large larva in a bilberry patch can often be detected by a group of stems denuded of leaves. Again a larva which has found a bramble shoot will come up from the ground rubbish at feeding-time

day after day and systematically denude the stem of leaves. In captivity all the *quercus* larvae readily take to and thrive upon hawthorn.

In no life-cycle group described is there any distinctive imago feature and, so far as I know, the moths are typical *quercus*. There is, of course, ground colour variation in the females, which range from pale buff to brown, and to a lesser extent in the males.

The table shows typical life-cycles for the bilberry-feeding and heather-feeding larvae, in the localities considered.

	Foodplant Bilberry. Conditions favourable.	Foodplant Bilberry. Conditions unfavourable.	Foodplant Heather.
July.	—	Ova.	Ova.
August.	Ova.	Ova and larvae.	Ova and larvae.
September.	Larvae feeding.	Larvae feeding.	Larvae feeding.
October.	"	"	"
November.	Larvae dormant.	Larvae dormant.	Larvae dormant.
December.	"	"	"
January.	"	"	"
February.	"	"	"
March.	Larvae feeding.	"	"
April.	"	Larvae feeding.	Larvae active—little food.
May.	"	"	Larvae feeding.
June.	Pupae.	"	"
July.	"	Pupae.	"
August.	Imago.	"	Pupae.
September.	—	"	"
October.	—	"	"
November.	—	"	"
December.	—	"	"
January.	—	"	"
February.	—	"	"
March.	—	"	"
April.	—	"	"
May.	—	"	"
June.	—	"	"
July.	—	Imago.	Imago.
August.	—	"	"

#### PAPILIO MACHAON IN NORTH WEST FRANCE.

By Brigadier-General B. H. COOKE, C.M.G., C.B.E., D.S.O., F.R.E.S.

In the September number of the "Entomologist's Record" Mr H. J. Turner asks for information about the distribution of *P. machaon* in N.W. France. *Machaon* occurs in Brittany in two generations. I have taken it near St Malo as early as 9th April, and a second generation in July and August. Though not very abundant in any particular locality, it is widely distributed, and though my experience of it in Northern France is confined to Ille-et-Vilaine, the late Charles Oberthür reported it as being spread over the Departments of Morbihan, Finistère, Loire-Inférieure, Mayenne, Maine-et-Loire, Orme, Manche, Deux Sèvres and Sarthe.

I find it difficult to understand what is meant by s.sp. *gorganus* Früh. There are in my collection various series of *machaon* taken by me in Norfolk, Austria, Hungary, Hautes Pyrénées, Provence, Alpes



Maritimes, Corsica, Southern Spain and the Western Himalayas (up to 11,000 feet). I have found that specimens from Brittany, Austria, Hungary and the Pyrénées vary among themselves locally, but that none of these countries seem to have a distinctive race.

Mr E. B. Ford, in his book "Butterflies," gives a figure of what he calls "the French race *gorganus*." Only three specimens in my collection resemble this illustration at all closely, and all three were taken near Vienna. I have taken a good series in the Norfolk Broads, and undoubtedly the British race is very constant, but I cannot agree with Mr Ford that the ground colour of fresh British specimens is of a deeper yellow than those of other European races; on the contrary, my Norfolk insects have the ground colour of a primrose shade, whereas practically all my foreign specimens are of a slightly deeper shade of yellow. The heavy nervures and wider, triangular, sub-marginal band are frequently as pronounced in southern Spanish *machaon* as in s.sp. *britannicus*, and the position of the dark mark at the end of the cell is similar. I took a short series of *machaon* in Corsica, flying with *P. hospiton*, Gené, which are almost indistinguishable from small specimens of s.sp. *britannicus*.

I possess a book published at Rennes by Charles Oberthür, "Faune Entomologique Armoricaine, Lépidoptères," describing the butterflies of his much loved Brittany. The figure therein of the local *machaon* is much nearer to s.sp. *britannicus* than to Mr Ford's illustration of "the French race *gorganus*," and I have taken similar specimens in North Brittany.

[We much regret to hear of the sudden death of Brigadier-General Cooke on 20th September 1946, the day after he wrote desiring to make a slight amendment to his article.—EDITORS.]

## NAMES OF MICROLEPIDOPTERA.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

(Continued from Vol. ~~LI~~ p. 160.)

### 27. GLYPHIPTERIX CRAMERELLA, Fb. 1777.

*Tinea cramerella*, Fb., *Genera Ins.*, pp. 296-297, No. 64-65 (1777).  
[England].

*Tinea forsterella*, var.  $\beta$ , Hw., *Lep. Brit.* [iv], p. 577, No. 59 (1828).

||*Heribeia simpliciella*, Steph., *Ill. Brit. Ent. Haust.*, IV, 263, No. 4 (30.xi.1834).

||*Heribeia cognatella*, Steph., *Ill. Brit. Ent. Haust.*, IV, 263, No. 5 (30.xi.1834).

*Heribeia forsterella* [nec Fb.], Wood, *Index Ent.*, p. 194, t. 43, f. 1340 (1837).

*Heribeia simpliciella*, Wood, *Index Ent.*, p. 194, t. 43, f. 1341 (1837).

*Heribeia cognatella*, Wood, *Index Ent.*, p. 194, t. 43, f. 1342 (1837).

||*Aechmia fischeriella*, Zeller, *Isis*, XXXII, 204, No. 3 (iii.1839).

||*Elachista aechmiella*, Dup., *Lep. Fr.*, XI, 533-534, No. 1637, t. 308, f. 7 (ante xi.1840).

||*Aechmia roeslerstammella*, F.R., *Microlep.* (Heft 17), pp. 242-244 (1841: ?1840) [and as "*desiderella*" only (uninominal) on t. 82, ff. 3 a-e].

||*Aechmia desideratella*, Dup., *Lep. Fr. Suppl.*, IV, 322, No. 481, t. 77, f. 3 (4.v.1843).

*Aechmia fischeriella*, H.S., *Schmett. Eur.*, V, 94, No. 138 (1854).

*Glyphipteryx fischeriella*, Stt., *List. Brit. Anim. B.M.*, XVI, 106, No. 6 (1854): Stt., *Ins. Brit. Tin.*, p. 176, No. 6 (1854): Stt., *Manual*, II, 365 (1859): Morris, *Brit. Moths*, IV, 138, t. 114, f. 18 (1869?): Wocke, *Cat. Lep. Eur.*, p. 309, No. [ii] 2316 (1871): Stt., *N.H. Tin.*, XI, 266-277, No. 3, t. 7, ff. 3 (1870) [biol.]: Wocke, Hein., *Kleinschm. Deutschl.*, II, ii, 398-399, No. 612 (1876): Snellen, *Vlind. Ned. Microlep.*, p. 754, No. 3 (1882): Meyr., *Handb.*, p. 705, No. 6 [partim] (1895): Rebel, *Cat. Pal. Lep.*, II, 130, No. 2336 [partim] (1901): Meess in Spuler, *Schmett. Eur.*, II, 299, No. 13 (1910): Meyr., *Cat. Glyph.*, p. 43 (1913): Meyr., *Wytsm. Gen. Ins.*, fasc. 164, p. 30 (1914): Meyr., *Rev. Handb.*, p. 709, No. 3 (1928): Waters, *E.M.M.*, LXIV, 252 (1928): Hering, *Schmett. Mitt. Europ.*, p. 177, f. 341 (1932).

Fabricius' concise but excellent description of his *Tinea cramerella* clearly applies to our *Dactylis* species, which of recent years has achieved some economic notoriety as "the Cocksfoot Moth" by destroying the seeds of this grass, and I have been asked to publish this synonymy for reference by Economic workers. It may be noted that Hübner described the genonym as *Glyphipterix*—and not as "*Glyphipteryx*," which is a later emendation.

## 28. OECOPHORA GEOFFRELLA, Linn. 1767.

*P[halaena]* *Tinea geoffrella*, Linn., *Syst. Nat.* (ed. xii), I, ii, 896, No. 430 (1767) [Germany].

||*Tinea geoffroyella*, Fb., *Spec. Ins.*, II, 301, No. 67 (1781).

||*Phalaena Tinea cramerella* [nec *Tinea cramerella*, Fb. 1777], Stoll, *Cramer's Pap. Exot.*, IV, 224, t. 396, f. M. (1782). ["Surinam": error loci].

||*Recurvaria geoffroyi*, Hw., *Lep. Brit.* [iv], p. 556, No. 42 (1828) [redescr.].

||*Harpella gruneriella*, Stt., *Cat. Brit. Tin.*, p. 12, No. 1 (1849) ["*Gruneriella*, Mann in litt.," quoted as a syn. of "*geoffroyella*," so now validated as a name].

*Alabonia geoffrella*, Rebel, *Cat. Pal. Lep.*, II, 176, No. 3330 (1901).

*Oecophora geoffrella*, Meyr., *Rev. Handb.*, pp. 664-665, No. 1 (iii.1928).

Here we have the second usage of the combination, *Tinea cramerella*.

## 29. LITHOCOLLETIS HARRISELLA, Linn. 1761.

*Ph[alaena]* *Tinea harrisella*, Linn., *Faun. Suec.* (ed. ii), p. 363, No. 1412 (1761).

||*Tinea cramerella* [nec Fb. 1777], Fb., *Ent. Syst.*, III, ii, 327, No. 173 (1794).

||*Argyromyges hortella* [nec Fb.], Steph., *Ill. Brit. Ent., Haust.*, IV, 257-258, No. 12 (30.xi.1834): Wood, *Index Ent.*, p. 192 (1.ix.1837), t. 42, f. 1324 (1.vi.1837).

*Argyromyges cramerella*, Steph., *Ill. Brit. Ent. Haust.*, IV, 257, No. 11 (30.xi.1834): Wood, *Index Ent.*, p. 191 (1.ix.1837), t. 42, f. 1323 (1.vi.1837).

||*Elachista tenella*, Dup., *Lep. Fr. Suppl.*, IV, 310-311, No. 469, t. 76, f. 5 (4.v.1843) [See Joannis, *Ann. S.E.Fr.*, LXXXIV, 121: 1915].



*Lithocolletis cramerella*, Zeller, *Linn. Ent.*, I, 234-236, No. 27, t. 1, f. 29 (1846): Meyrick, *Rev. Handb.*, p. 771, No. 2 (iii.1928): Benander, *Opusc. Ent.*, IX, 96-97, No. 2, f. 3a [Fw.] (xii.1944) [redesc.: throughout Sweden].

This is the third use of the combination, *Tinea cramerella*, a name which was a primary homonym from its very inception and can therefore never be used validly for this species, which in any case has a prior name which seems applicable.

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### COLLECTING NOTES.

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WITH reference to " Hy. J. T.'s " query on the race of *Papilio machaon* found in the North West of France, I do not know if the following observations, which I made on active service in North-West Europe in 1944-45, may be of any interest.

The only " Swallowtails " observed after landing in Normandy on 23rd June 1944 were three or four in the neighbourhood of my Brigade headquarters on the Eastern bank of the Orme just South of Caen on or about 15th July 1944.

This species was not seen again until 15th June 1945, when a number of larvae were found on carrot in a garden at Bergisch Gladbach, near Cologne, on 15th June 1946. Of these three or four emerged towards the end of July 1945 and several other pupae remained in this state until May 1946, when they emerged. The first wild specimen in the Cologne area was seen on 5th July 1945. I should say that in the Spring of 1945 I was in the Cuxhaven area, where no Swallow-tails were observed, and I have no information up to the date of the Spring emergence at Cologne. It does, however, appear that in the Cologne and district a proportion of the offspring of the Spring brood lie over and do not emerge till the following Spring.

When a P.W. in Italy in 1942-43 *machaon* was observed sporadically throughout the summer and ova from an early August (1942) female produced imagines in May 1943.—G. F. JOHNSON.

LEUCANIA ALBIPUNCTA IN SUFFOLK.—On 8th September 1946 a fresh female *Leucania albipuncta* was taken while feeding on rotten plums in a garden at Aldeburgh, Suffolk. South (*Moths of the British Isles*, Vol. I, p. 312) records this migrant species from Shoeburyness, Essex, but I can find no record from further north.—(Dr) P. J. L. ROCHE, F.R.E.S.

MOMPHA LACTEELLA, STEPH., NEAR WINCHESTER, HANTS.—All round Southampton and Winchester the war has taken its toll of the woodlands, and especially of the pines, larches and spruces. Where once were stands of conifers with no undergrowth are now acres of fireweed, ragwort, wild mignonnette, centaury, wild strawberry, mullein, spurge and seedling birches. In such a place on the edge of Farley Mount, while gathering a bunch of centaury for larvae of *Stenoptilia zophodactyla*, Dup., I noticed a small *Mompha* that I did not at first recognise. I watched it carefully and saw a second specimen flying lazily among the herbage. My net was at some distance so that it was not possible to catch the insects. By the time my net was hurriedly brought to me both insects had disappeared. Further search by Mr H. W.



Daltry and myself yielded only one specimen each of *Mompha lacteella*, Steph., taken flying among *Epilobium* spp. at about 8 p.m., B.S.T.

The following day we visited the spot again and worked long and patiently from 6 to 9 p.m., capturing each two specimens, all flying low. The weather was not very favourable, and no further opportunity occurred. We tried to smoke out insects from clumps of mixed herbage with no success whatever, and came to the conclusion that insects of all kinds were unusually scarce, except for *Plusia gamma*, L., *Nomophila noctuella*, Schiff., and *Plutella maculipennis*, Curt., which swarmed. All six specimens taken were very fresh. At the same time I caught one fresh *Mompha conturbatella*, Hb., which flew higher and settled on a leaf of *E. angustifolium*.

Of *Mompha lacteella*, Wakely says in *Proc. South Lond. Ent. Soc.*, 1944-45, p. 32, that "Stainton and Meyrick speak of this as not uncommon." Stephens certainly seems to have taken it freely and I possess two of his specimens. I do not know of any present day collector who has taken it, and an example was borrowed by Wakely from the British Museum for illustration. Hering: *Die Blattminen*, 1935-37, p. 210, says: "Mine und Raupe noch nicht genauer beschrieben. Seltene Art." Schütze: *Die Biologie der Kleinschmetterlinge*, 1931, p. 143, says: (I translate) "Larva from July to Autumn, imago from May to August; larva on *Epilobium hirsutum*; living according to Schmid between the leaves, according to Spüler mining in them." Eckstein: *Die Kleinschmetterlinge Deutschlands*, 1933, p. 144, says that the imago appears in V, VI, and again VII, VIII; and that the larva mines the leaves of *Epilobium* species in VII and IX. Records of captures on the continent are rare. Merrin: *Lepidopterist's Calendar*, 1875, gives the imago in June, July and August; localities, Yorks, Lake District, Bristol; but says nothing of the larva.

No doubt there are many other references, but the fact seems clear that the life-history of *M. lacteella* is still unknown, and one may hazard the guess that with exact knowledge the species will be found to be as common as are most of its congeners.—WM. FASSNIDGE.

**VOLUCELLA ZONARIA IN KENT.**—On the 23rd August I took a large fly in my garden on Budleia blossom and sent it to my friend, Mr H. W. Andrews, who has identified it as *V. zonaria*. Last year I captured another specimen of this insect in a wood between here and Dover. I understand it is a somewhat rare migrant.—CECIL M. GUMMER, 14 Manor Road, Deal, Kent.

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### CURRENT NOTES.

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**PRIORITY AT ALL COSTS.**—Only a few words can be employed in a mere note, so I feel impelled to record more fully my complete disagreement with Prout's views on nomenclature. For more than 30 years I have been fighting on the other side. At the International Congress at Oxford in 1912 I read a paper in which, while accepting priority as the basis of nomenclature, I spoke strongly against its being used unchecked. Over and over again I have shown that priority at any cost must by its

very nature be the most potent enemy of fixity of nomenclature (see *e.g.* *Entomologist*, lxxiv, p. 24, and lxxv, p. 163), and nobody has ever attempted to refute my arguments. The little parable on p. 164 of the article referred to seems to me to put the whole matter in a nut-shell.

In 1912 the fight was far from being a hopeless one, and, in fact, I met with a good deal of support, especially from America and Switzerland, and no formal opposition at all, and I still maintain that if the two checks which I have always upheld had been adopted (*viz.* that a generally recognized name should not be altered because an older one was found, and that under no circumstances should a name long applied to one species ever be switched over to another), fixity of nomenclature would automatically have been arrived at years and years ago.

In the same paper I dealt with the subject of emendations, upholding the view that if they were really such they should always be adopted. When we are told to accept not only misspellings due to ignorance but even those due to printer's errors, the matter has passed out of the region of the offensive (from a literary point of view) into that of the serio-comic.

The instance given with regard to names and so naively implied to be logical, is really a rather obvious instance of a logical fallacy, as the two classes of names are treated as the same whereas they are in two different categories. A name invented for a particular object means that object (there is no such thing as a *name* without a meaning) and has only one spelling, whereas a name, such as *corydon*, has a meaning already and that meaning is extended when it is given to something else—a blue butterfly, for instance, but that does not change the spelling of the name.

It must not be supposed that I fail to recognize the value of Prout's work because I disagree with his views on nomenclature. I joined issue with him on the subject of emendations, but this never had the slightest effect on the cordiality of our personal relations.—G. WHEELER.

I HAVE heard at last from Austria. In reply to a card addressed to my good friend, Dr Hans Zerny, Dr Max Beier, the Head of the Zoological Section of the Nat. Hist. Museum in Vienna, very kindly sent me the following information. The worst news is that the well-known and most able of entomologists, Dr H. Zerny, who took Dr Rebel's position as head of the Entomological Section, has passed away. I am told that he died suddenly during the autumn of last year. His colleagues in the Museum speak in the highest terms of their beloved comrade and of the great loss the Museum has suffered by his passing. He is succeeded in the Lepidoptera Collection by Dr Pittioni. I understand the Museum suffered only slight damage during the war. Luckily, the Collections are almost all intact and also the Library is not injured. The latter, which is situated in a different part of the Burgring, suffered somewhat from mould but there is no real damage.

DR HANS ZERNY was one of the best informed of the Austrian workers and had experience of active collecting in the Balkan States, Sicily, Spain, N. Africa, S. America, etc., and had written up and illustrated his journeys, as well as reading notes at Society meetings and sending communications to the magazines. I met him during the International



Congress held at Zurich and was much impressed by his knowledge, and we subsequently aided each other in various ways. His early death is a loss to our Science. It will be remembered that Dr Rebel, whom Zerny succeeded, was the co-editor of the famous "Staudinger's List."

**PRACTICAL HINTS FOR THE FIELD LEPIDOPTERIST.**—A new and augmented edition of the work of this title, published between 1901 and 1908 by the founder of the *Ent. Record*, J. W. Tutt, is being prepared by the Amateur Entomologists' Society. The Editor, Mr B. A. Cooper, would be very grateful to receive additional hints, not in the original parts, or corrections to these parts. It is particularly hoped to include notes on pairing, rearing, hibernating and obtaining emergences and eggs in captivity of our native species. New illustrations and introductory chapters on the making of apparatus, breeding and experimental studies for the amateur Lepidopterist are also to be added, and offers to contribute to these are also desired. It may also be possible to pass the typescripts around to a limited number of readers prior to sending to press for the incorporation of last-minute additions, and any experienced collectors and breeders likely to be able to help thus are also invited to communicate with the Editor.—B. A. COOPER, 61 Okehampton Road, London, N.W.10. [This project was discussed with the late H. E. Page, who strongly supported it. The matter will be reclassified and in no way a copy of the original "Hints."—HY. J. T.]

THE *Ent. News*, Philadelphia, for May 1946 (delayed), published a curtailed account of the article in *Nature*, 11th May, "The Present State of Some German Museums," contributed by F. J. Griffin. In this note we are pleased to find that the valuable collections in the Deutsch Entomologische Institut in Berlin-Dahlem, the Museum under the care of our very worthy friend, the late Dr Horn, are intact and that the building suffered no damage.

In the same number the *Ent. News* contains an article of what has recently been stated about the high resistance to wetting by water of the cuticle of insects. It contains a summary of recent articles by Ramsey, Pryor, Wigglesworth, etc. Its control of the effects of Insecticides is considered.

Another short article deals with what has been looked upon from a curiosity view in the past under the title "Insects as Food in Japan." The "food" especially noted comprises the "yellow-jacket wasp" larvae and pupae, all species of *Cicadae*, fresh-water insects of all orders, "the larvae and pupae are delicious;" Lepidopterous pupae not found in the soil are said to be "very tasty," including, of course, the silkworm, when the silk is reeled from the cocoons, fried in fat and salted.

THE Annual Exhibition of the S. London Entomological and N. Hist. Society will be held in the rooms of the Royal Society, Burlington House, Piccadilly, on the afternoon of Saturday, 26th October. For many years this Meeting has been one of the most attractive features of the Autumn Season for S. London naturalists and a general gathering of all within easy reach of the metropolis and a good sprinkling of friends from further afield. Intending exhibitors may leave their exhibits at any time after 10 a.m. and the Editor will be there at 1.30 p.m. The meeting will be formally opened by the President at 2.30 p.m.



## EXCHANGES.

- Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.
- Wanted**—American Hesperilidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write K. J. Hayward, Instituto Miguel Lillo, Calle Miguel Lillo 205, Tucuman, Republica Argentina.
- Desiderata**—Dipterous parasites bred from Lepidopterous larvae or pupae, or from any other animal.—H. Audcent, Selwood House, Hill Road, Clevedon, Somerset.
- Wanted**.—*Lycaena* (*Heodes*) *phlaeas* from all regions including British Isles. Also wanted other species of Chrysophanids from all areas. Exchange or purchase considered. *Duplicates*.—Foreign Lepidoptera, e.g., Satyrids, Charaxes, Papilios, and others; full lists sent.—P. Siviter Smith, 21 Melville Hall, Holly Road, Edgbaston, Birmingham, 16.
- Wanted** for cash or exchange many species of ova, larvae or pupae, especially local forms and *A. grossulariata* from different localities, also Seitz Vol. 1 and Supplements to Vols. 1-4. Offers also, Tutt's *Practical Hints*, Parts 1 and 2, Buckler's larvae, Vols. 1-6, and Tutt's *British Noctua*, Vols. 2, 3, and 4.—Dr J. N. Pickard, F.R.S.E., 36 Storeys Way, Cambridge.
- Wanted**.—Various monthly parts of *Entomologist's Record* for 1914, 1915, 1916, 1917, 1919, and 1920. Please report any odd monthly parts (in wrappers as issued) prior to these years.—P. B. M. Allan, 4 Windhill, Bishop's Stortford, Herts.
- Wanted**.—Males of *Morpha menelaus*, *M. didtus*, *M. rhetenor* in papers.—Leonard Tatchell, Rockleigh Cottage, Swanage, Dorset.
- Wanted** urgently for experimental purposes, pupae of *betularia*, *porcellus elephanor*.—Dr H. B. D. Kettlewell, Homefield, Cranleigh, Surrey.
- Wanted**, set or in papers, perfect specimens of *Lycaena arion*, *L. corydon*—vars. *syngrapha* and *semi-syngrapha*, *Thecla betulae*, *T. w-album*, *Nemeobius lucina*, *Vanessa polychloros*, and *Papilio machaon*, in exchange for British, Indian, Australian, African and American Rhopalocera, in papers.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.
- Wanted**, British butterflies, set or in papers, in exchange for *Morpho papirius*, *Morpho didama*, and other Morphos.—Chas. B. Antram, "Rivermead," Keynsham, near Bristol, Glos.
- Exchange**.—I would like to get in touch with those interested in exchanging living ova and larvae of southern species of Lepidoptera for northern species and adults. Write stating wants and probable offers.—J. K. Goody, Weldon, 26 Carr Wood Road, Bramhall, Cheshire.
- Wanted**.—Information re literature on West African Lepidoptera.—Surgeon Lt. H. M. Darlow, R.N., F.R.E.S., Corr House, Glebe Road, Bedford.
- Wanted**.—Buckler's Larvae, Vols. 8 and 9.—C. Bignell Pratt, 1 West Ham Lane, Stratford, E.15.
- Books Wanted**.—*The Amateur Entomologist*, Vols. 1-3.—H. W. Andrews, 6 Footscray Road, Eltham, London, S.E.9.

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*Royal Entomological Society of London*, 41 Queen's Gate, S.W.7: November 6th and 20th; at 5.30 p.m. *South London Entomological and Natural History Society*, c/o Royal Society, Burlington House, Piccadilly, W.1: 2nd and 4th Wednesdays; 6.0 for 6.30. ANNUAL EXHIBITION, SATURDAY, 26th October, 2.0 for 2.30 p.m. *London Natural History Society*: Tuesdays, 6.30 p.m., at London School of Hygiene or Art-Workers' Guild Hall. Syllabus of Meetings from General Secretary, H. A. Toombs, Brit. Mus. (Nat. Hist.), Cromwell Road, S.W.7. *Birmingham Natural History Society*: Last Fridays in month, 7.0 p.m., at Birmingham Photographic Society's Rooms, York House, Great Charles Street, Birmingham.

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## SOME REMARKS ON LASIOCAMPA QUERCUS, L.

By B. J. LEMPKE.

In 1931 (*Bull. Soc. Léop. Genève*, 6: 126) A. Pictet published a very interesting article on the habits of *Lasiocampa quercus*, L., during and after copulation, entitled: "Recherches expérimentales sur l'accouplement bilatéral et la double ponte de *Lasiocampa quercus*, L." (Experimental researches on the bilateral copulation and the double egg laying of *Lasiocampa quercus*, L.). The article may be summarized as follows:

1. As soon as a ♂ is placed into a cage with a virgin ♀ it sets to the *left side* of the ♀ and copulates with it for the first time during about 20 minutes. Then the ♂ separates from the ♀ and remains motionless at a short distance from her for about 15 minutes. Thereupon it returns to the same ♀, takes place at her *right side* and copulates again, a bit longer than the first time.

2. Immediately after the second copulation the ♀ deposits a first series of eggs, then she remains quiet for one to five days, depending on the temperature, and lays the rest of her eggs (about one quarter).

3. The first (left) copulation is the normal one with the object to fecundate the eggs. The second (right) copulation, during which the penis is not introduced into the vagina but into the ovipositor ("l'orifice de ponte"), serves to facilitate the emission of the eggs.

4. If a ♀ has received the ♂ only at its left side, it waits some days before depositing her eggs which are fertile.

5. If a ♂ which has copulated with a first female at her left side is placed with a second virgin female, it copulates with her, but only at her *right side*. This female at once lays her eggs which are *infertile*.

6. A ♀ has copulated for the first time (to the left). Now the ♂ is taken away and replaced by another virgin one. After some hesitation this copulates to the *right side* of the ♀ (deviation from the rule) and after the usual pause for the second time to the right side.

This summer (1946) I bred a good series of *Lasiocampa quercus* in order to learn something about the race which inhabits the northern provinces of our country. This race is characterized in the first place by its caterpillars, which are of a fine dark red-brown when full-grown, strongly reminding one of *Macrothylacia rubi*, L. Yet they cannot be true representatives of race *callunae*, Palmer, as the very great majority of them (more than 95 per cent.) have a life-cycle of one year.

The remainder of our country is inhabited by the ordinary race with grey-brown caterpillar, so excellently figured in *Svenska Fjärilar*, pl. 12, fig. 11.\* The imagines are not so easy to distinguish owing to the great individual variability, though in series the difference between the two races is obvious.

I had about 50 pupae and so was in an excellent position to check the results of Pictet with our race. My results were as follows:

1. On 12th July a ♂ was found in *cóp.* with ♀ No. 1 at 17.15. It sat at the left side of the ♀. At 17.20 the couple separated. The box

\*This does not mean, however, that this Dutch race is identical with the Swedish one. The ♂ and ♀, figured in the Swedish work, are stouter than the Dutch specimens. This is confirmed by the figures given by Wahlgren: span of the Swedish specimens 56-83 mm. But the Dutch specimens measure 47-70 mm. Much has still to be done on the study of the races of this interesting species.



was open and the ♂ did not take a position at a short distance from the ♀ but flew away as far as possible, that is against the window where it flew wildly up and down, trying to escape. It is clear that in a state of nature this ♂ would never have returned to the ♀. I put, however, the ♂ in the box again, where it continued flying wildly about till 17.55. Then it again entered into *cop.* with ♀ No. 1 till 18.06. It again sat *at the left side* of the ♀! From 18.06 till 18.12 the ♂ repeated its violent flying but now I kept the box closed so that it could not escape. From 18.12 till 18.41 it copulated with ♀ No. 2 (it is absolutely certain that this was a virgin one!) and sat *at the right side* of her. After this *cop.* the ♂ was liberated and the ♀♀ were kept in separate boxes for further observation.

2. On 16th July another ♂ was found in *cop.* with ♀ No. 3, sitting on the left side. This *cop.* lasted at least a quarter of an hour, then the couple separated. The ♂ flew wildly about but could not escape. After some time it again copulated with ♀ No. 3, from 19.20 till 19.45, and sat again *at her left side*. Then the flying about was repeated till 20 hours when the ♂ once more copulated, now with female No. 4, till 20.15. It was now placed *at the right side* of this female. When this couple separated the ♂ was allowed to escape.

It is clear that the behaviour of the two ♂♂ is not in accordance with the rule stated by Pictet. As to the ♀♀, Nos. 1 and 3 had copulated twice, both times at the left side. So they ought to wait some days before they would lay eggs, which would be fertile. Nos. 2 and 4 had only copulated once and that only at the right side. They ought to start at once laying eggs, which would be infertile. The practice was, however, very different. All females kept quiet till it was quite dark. Then they started flying about in their box and the next morning every female had produced a great number of eggs. All remained quiet for several days and died at last without laying a second batch of eggs. The eggs of ♀ No. 1 practically all hatched. Of those of No. 2, which ought to be infertile, about  $\frac{3}{4}$  hatched. No. 3, which had copulated twice at the left side for a sufficiently long time, produced eggs of which only 30 per cent. hatched. Several caterpillars were not able to leave the egg shell completely so that the partial hatching is probably caused by weakness. Female No. 4, which had only once copulated, and that on the right side, ought to lay infertile eggs. Practically all her eggs hatched!

So it is quite evident that my results are in complete contradiction with those of Pictet. My experience is:

1. It is highly improbable that in a state of nature the ♂ copulates twice with the same ♀.

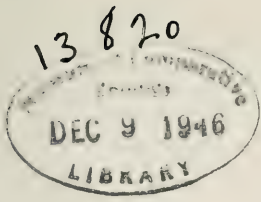
2. Copulation may take place at the left side, but also at the right side of the ♀. In both cases the penis is introduced into the vagina for in both cases the eggs are fertile.

3. The same ♀ can attract a ♂ more than once. This need not be the same ♂ at all. Every time a normal copulation takes place.

4. The ♀ starts laying eggs the night following immediately upon the copulation. The question on which side *cop.* took place is of no importance.

Is Pictet wrong? I should not like to express such a definite opinion. I only know for certain that the Dutch race with red-brown caterpillar (I have to do still a good deal of work before I can state the name of this





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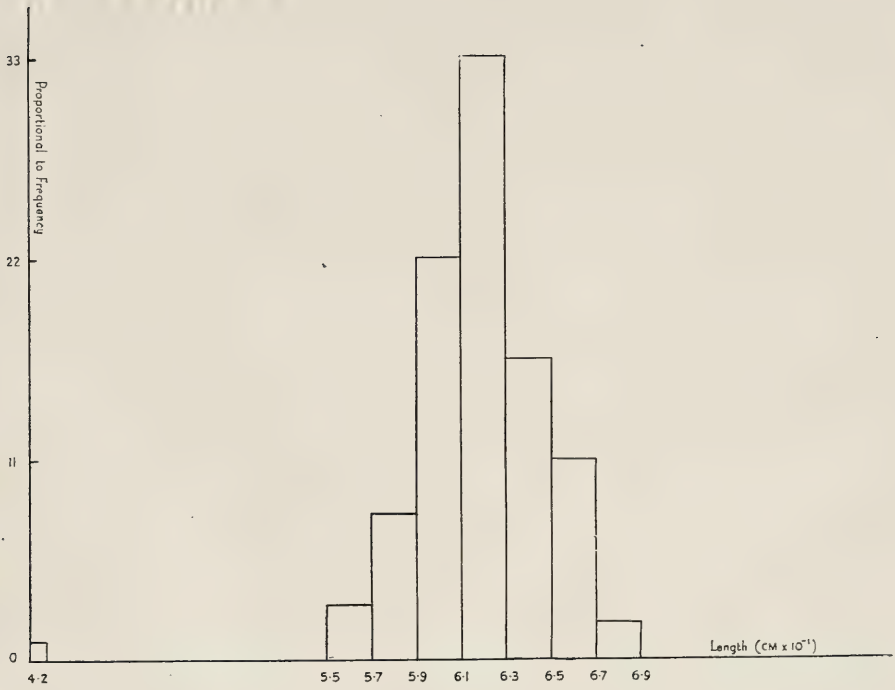


Fig. 1.

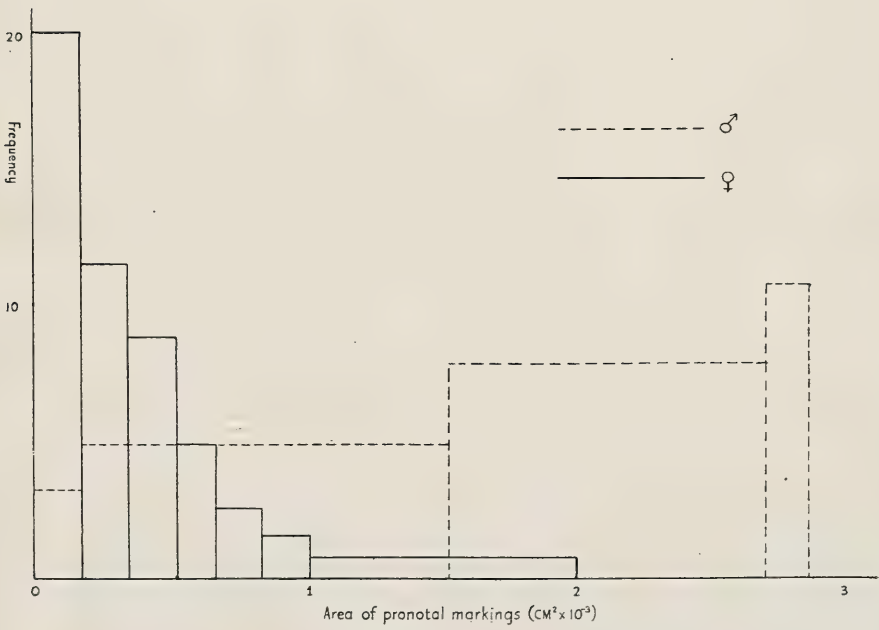


Fig. 2.

AREA OF PRONATAL MARKING.

race) behaves in quite another way than that observed by Pictet, in a way I should call quite normal. I am convinced that our other race with grey-brown caterpillar behaves in the same way though I have no special notes of it. It is at any rate certain that if Pictet's observations of the double copulation and what is annexed with it are right, they do not hold good for the species as a whole but only for the races he experimented with. I may add that about this question nothing is to be found in Tutt's *British Lepidoptera*, Vol. 3, 1902, in the paragraph treating the habits of *Lasiocampa quercus* (l.c., p. 103).

Oude Yselstraat 12 III, Amsterdam, Z.

[NOTE.—When Mr Joseph E. Williams was here in Southampton in the summer term of 1939 he investigated this same question, which was the reason for his visit to England. I translated into English for him and he did the experiments. I remember he came to the conclusion that the observation of Pictet did not apply to our English *L. quercus*.—W. FASSNIDGE.]

## NOTES ON THE ASPARAGUS BEETLE, *CRIOCERIS ASPARAGI*, L.

### PART II: VARIATION (*continued*).

By BERNARD VERDCOURT, B.Sc.

(Plate XVIII.)

A few quantitative measurements were made on numbers of the beetles collected at random throughout the season. All linear measurements were made with the aid of a binocular microscope fitted with a micrometer eye-piece and used as a monocular instrument.

LENGTH.—The variation in length is fairly small as is shown in the histogram (fig. 1). The maximum deviation from the mean value was shown by a male specimen of length 4.2 millimetres. This was obviously a freak and has been neglected in the calculation of mean values. Normal specimens range from 5.5-6.8 mm. Joy gives 5-6.5 mm. The mean values for both males and females is 6.2 mm. The histogram therefore shows no traces of a bimodal character.

PRONOTAL MARKINGS.—Close attention was paid to these markings and some correlation was found to exist between these and the sex of the individual. The relation was investigated by sexing a hundred or so individuals (in all batches collected sexes were present in almost equal proportions) and roughly measuring the area of black on the pronotum of each. 100% of the specimens bearing the maximum observed amount of black (0.28 sq. mm.) were males whilst 86.5% of those bearing no traces of black were females. Between these two limits however specimens of both sexes were found to possess varying amounts of black. Not only does the area of the black vary but the intensity also, thus rendering measurements difficult. The rough graphs (fig. 2) gives some idea of the relationship of the attributes sex and pronotal markings. This figure is not based on accurate measurements but merely represents the main tendency of the relationship.

ELYTRAL PATTERN.—The relation of the types to sex (see fig. 1 in Notes I) is given in the following table expression % of given sex belonging to a certain type.



TYPE OF PATTERN.	1	2	3	4	5
♂ ♂	18.3 %	60.0 %	11.7 %	8.3 %	1.7 %
♀ ♀	27.3 %	52.5 %	18.2 %	2 %	0 %

Type 1 represents the maximum amount of black and type 5 the least, but there is no clear relation between this and sex. The females would appear to be more pigmented on the whole.

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**" RHINGIA MACROCEPHALA " NOT A VALID NAME IN  
DIPTERA (SYRPHIDAE).**

By J. E. COLLIN, F.R.E.S.

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Students of Diptera will have noticed on p. 113 of the September number of this Magazine references to a "*Rhingia macrocephala*," presumably meaning the common Syrphid *Rhingia campestris*, Mg. The use of the trivial name *macrocephala* for this species is a nomenclatural error, evidently due to an oversight, and should not be adopted. The facts are as follows:—In 1776 Moses Harris described and figured in his "Exposition of British Insects" an insect, which was certainly a species of *Rhingia*, as *Musca macrocephala*, L. At the end of his description he gave a reference to *Conops macrocephala*, L., in exactly the same manner as he employed throughout his work when redescribing a Linnaean species. The use of this Linnaean name by Harris was however very obviously incorrect, because the description of *Conops macrocephala* by Linnaeus, to which Harris referred, was clearly that of a Conopid, and not the Syrphid which Harris' description and figure equally clearly indicated; indeed Harris' identification of his species as *Conops macrocephala*, L., was so obviously incorrect that the question whether his reference to that name was not a mistake, which will be shown later to be highly probable, becomes almost a certainty. Irrespective of this mistake the case is one of interest because the species described and figured by Harris was evidently one which, though very closely allied to a *Conops rostrata* also described by Linnaeus, and apparently answering exactly to the *Rhingia rostrata* of Scopoli (1763) and De Geer (1776), was not actually recognised as a distinct species until 1822. It was, in fact, a species answering to the description of one which Meigen in 1822 separated from *rostrata*, L., under the name *Rhingia campestris*, n. sp., quoting *Rhingia rostrata*, L., of De Geer as a synonym (Scopoli's work being apparently unknown to him).

It is quite clear from the original publication that Harris merely identified his species as one which he thought Linnaeus had designated under the name *macrocephala*, and he plainly indicated that this name was not proposed by him, but had been proposed by Linnaeus as the trivial name under which a species had been first designated, therefore the law of priority (Article 25 of the Rules of Nomenclature) cannot be applied to Harris' use of the name *macrocephala*, and, under the circumstances of the case, *macrocephala* is an impossible valid trivial name for the species of *Rhingia* which Harris described and figured.

Article 23 of the Rules also makes it clear that, in spite of Harris' use of a new combination of Linnaeus' trivial name *macrocephala* with a different generic name (*Musca*), Linnaeus still remained the author

of that trivial name, and Harris' species became the *Musca macrocephala*, (L.) of Harris, which when found *not* to be the same as *Conops macrocephala*, L., remained without a valid name until Meigen in 1822 described what is now presumed to be the same species as *Rhingia campestris*, n. sp.

When it was discovered and published that *Musca macrocephala*, (L.) of Harris was not the *Conops macrocephala*, L., which Harris apparently believed it to be, Harris' species was identified first as *Rhingia campestris*, Mg., and later as *Rhingia rostrata*, (L.) (described by Linnaeus as a species of *Conops*), and this brings us to the question whether the reference to *Conops macrocephala*, L., by Harris was not a mistake for *Conops rostrata*, L. Both names appear in the 12th Edition of Linnaeus' *Systema Naturae*, to which Edition, according to a statement in the Introduction to Harris' "Exposition," all his references to Linnaean species were made, and Harris on page 71 correctly recognized *Conops macrocephala*, L., as a species of *Conops* (an identification easily made from Linnaeus' description) therefore when only eleven pages later Harris again refers a species to *Conops macrocephala*, L., this time a Syrphid of the distinct genus *Rhingia*, and we know that he had knowledge of Linnaeus' description of *Conops rostrata*, L., easily identifiable as that of a species of *Rhingia*, we are justified in assuming that this second reference to a *Conops macrocephala*, L., was a mistake for *Conops rostrata*, L. There are sufficient examples of carelessness in Harris' work to make it reasonable to believe that this second reference was a major mistake, and its acceptance as such undoubtedly clarifies everything that was otherwise obscure, though it in no way affects the question of the invalidity of the use of the name *macrocephala* for our common species of *Rhingia*.

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## OBSERVATIONS ON THE SPEED AT WHICH ANTS OF THE GENUS MESSOR TRAVELLED (HYM. FORMICIDAE) IN ALGERIA.

By W. PICKLES, F.R.E.S.

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Observations were made on nests of the ant *Messor barbarus*, L., *barbarus* during the year 1943 on a waste piece of ground on a hillside at Souk Ahras in Eastern Algeria. As is well known, these ants make long processions from their nests to the areas where they are collecting grass seeds and other seeds which they carry back to the nest.

Whilst making observations on these ants travelling to and from their nests along the well-defined trackways they appeared to travel at a more or less regular rate both going out and returning to the nest. When these ants emerge from their nests to go foraging, they resemble a stream of water flowing from a spring down the hillside; the whole column appears to glide along. On several occasions this "flood" of ants issuing from the nest was timed over a given distance and the average speed at which it was travelling calculated. For example, on 1st August 1943 such a stream of ants was emerging from a nest and this was observed to pass a given point at 6.6 p.m. (Double British Summer Time) and 9 minutes later at 6.15 p.m. they had travelled a distance of 45 feet. This works out at an average speed of 1 inch per



second. All these ants were carrying nothing. Another such record was established on 12th August 1943 when ants from another nest were observed just setting out on their foraging expedition at 6.22 p.m. and travelled 9 ft. in 3 min. 20 sec. (by 6 hrs. 25 min. 20 sec.). The average speed at which these ants were travelling was 0.54 inches per second. On 18th June two experiments were carried out to ascertain at what speed this species of ant was capable of travelling when carrying a load. Two ants covered a distance of 35 ft. in 23 mins. at an average speed of 0.3 ins. per second.

From many observations it became apparent that there were several factors which would govern the speed of the ants: (1) the distance travelled, i.e. fatigue; (2) whether loaded or not; (3) direction and velocity of the wind (this has a marked effect on ants when carrying large inflorescences capable of offering considerable resistance to the wind). The effect of wind on ants carrying loads might be very serious; cases were noted when an ant was completely lifted from the ground by the wind and deposited 6 inches or more away still holding on to its load. To try to eliminate as many factors as possible which would affect the speed of the ants, it was decided to make observations during the month of August (in actual fact they were made from 24th July until 1st September; circumstances beyond my control necessitated this change or modification). As far as possible the same hours of the day were utilised for the observations, i.e. roughly from 6.30 p.m. to about 8 p.m. (Double British Summer Time). The load that each ant was carrying, whether the worker was a micrergate or macrergate (small or large worker), etc., the direction of the wind (head, back, side, etc.) and the size of the inflorescence, i.e. whether consisting of one or more seeds was noted. Two hundred separate observations were made over a given distance of 10 feet, which was the last 10 feet which the ants had to travel on their way back to the nest from their foraging activity. Details of these observations are given in the accompanying table.

TABLE I. THE SPEEDS AT WHICH THE ANT *M. B. BARBARUS* TRAVELS WITH ITS LOADS.

Date.	Commencing time.			Finishing time.			Dist. in feet.	Time taken.		Speed in in./sec.	Wind.	Remarks: Type of ant, load, etc.	
	Hr.	Min.	Sec.	Hr.	Min.	Sec.		Min.	Sec.				
24.vii.43.	8	0	20	8	2	30	10	2	10	0.92	Side.	Large.	1 seed.
	8	3	0	8	4	55	"	1	55	1.04	"	"	1 "
	8	6	30	8	8	45	"	2	15	0.89	"	"	2 "
	8	10	50	8	12	35	"	1	45	1.14	"	"	1 "
	8	14	22	8	16	10	"	1	48	1.11	"	"	2 "
	8	18	35	8	21	45	"	3	10	0.63	"	"	2 "
	8	24	30	8	29	42	"	5	12	0.33	"	"	3 "
	8	31	30	8	35	5	"	3	35	0.56	"	"	0 "
26.vii.43.	6	57	30	7	0	45	"	3	15	0.62	"	Small.	2 "
	7	1	30	7	4	0	"	2	30	0.80	"	"	1 "
	7	5	0	7	7	25	"	2	25	0.83	"	Large.	1 "
	7	8	0	7	9	32	"	1	32	1.30	"	"	1 "
	7	11	0	7	13	48	"	2	48	0.71	"	Small.	1 "
	7	15	0	7	20	25	"	5	25	0.37	"	"	1 "
	7	22	0	7	24	44	"	2	44	0.73	"	"	1 "
	7	26	0	7	28	12	"	2	12	0.99	"	Large.	1 "
	7	29	0	7	31	20	"	2	20	0.85	"	"	2 "
	7	32	0	7	34	38	"	2	38	0.76	"	"	0 "



Date.	Commencing time.			Finishing time.			Dist. in feet.	Time taken.		Speed in in./sec.	Wind.	Remarks : Type of ant, load, etc.	
	Hr.	Min.	Sec.	Hr.	Min.	Sec.		Min.	Sec.				
28.vii.43.	7	36	10	7	38	53	..	2	43	0.74	..	Small.	0 ..
	7	41	30	7	44	21	..	2	51	0.70	..	Large.	1 ..
	7	46	0	7	48	46	..	2	46	0.72	..	Small.	0 ..
	7	49	30	7	53	0	..	3	30	0.57	..	..	2 ..
	7	54	0	7	57	23	..	3	23	0.59	..	..	2 ..
	7	13	30	7	15	46	..	2	16	0.88	Back.	..	1 ..
	7	16	30	7	19	0	..	2	30	0.80	..	Large.	4 ..
	7	20	0	7	23	2	..	3	2	0.66	..	..	1 ..
	7	24	0	7	26	47	..	2	47	0.72	..	..	2 ..
	7	29	0	7	33	17	..	4	17	0.46	..	Small.	1 ..
30.vii.43.	7	39	15	7	43	40	..	4	25	0.45	..	Large.	1 ..
	7	44	15	7	48	22	..	4	7	0.48	..	..	3 ..
	7	51	30	7	56	50	..	5	20	0.37	..	Small.	1 ..
	7	57	30	8	3	40	..	6	10	0.32	..	..	1 ..
	8	4	30	8	9	12	..	4	42	0.43	..	Large.	1 ..
	7	24	20	7	27	15	..	2	55	0.69	..	..	1 ..
	7	27	45	7	30	23	..	2	38	0.76	..	..	1 ..
	7	31	0	7	33	30	..	2	30	0.80	..	Small.	1 ..
	7	34	0	7	36	34	..	2	34	0.78	..	Large.	2 ..
	7	38	50	7	42	23	..	3	33	0.56	..	Small.	1 ..
1.viii.43.	7	44	20	7	47	30	..	3	10	0.63	..	..	1 ..
	7	48	0	7	51	33	..	3	33	0.56	..	Large.	3 ..
	7	52	15	7	54	47	..	2	32	0.79	..	..	1 ..
	7	55	30	7	59	31	..	4	1	0.50	..	Small.	1 ..
	8	0	50	8	3	22	..	2	32	0.79	..	..	1 ..
	6	41	20	6	43	32	..	2	12	0.91	..	Large.	2 ..
	6	45	0	6	47	0	..	2	0	1.00	..	..	1 ..
	6	48	10	6	50	17	..	2	7	0.94	..	Small.	2 ..
	6	51	0	6	53	12	..	2	12	0.91	..	Large.	4 ..
	6	53	45	6	55	17	..	1	32	1.30	..	Small.	1 ..
10.viii.43.	6	55	48	6	57	30	..	1	42	1.17	..	Large.	1 ..
	6	58	0	6	59	15	5	1	15	0.80	..	..	1 ..
	7	0	0	7	1	28	10	1	28	1.37	..	..	1 ..
	7	2	15	7	4	32	..	2	17	0.88	..	..	3 ..
	7	6	45	7	8	18	..	1	33	1.29	..	Small.	1 ..
	7	1	0	7	3	14	..	2	14	0.89	..	Large.	2 ..
	7	3	45	7	6	6	..	2	21	0.85	..	..	3 ..
	7	6	45	7	8	30	..	1	45	1.14	..	..	1 ..
	7	9	0	7	11	27	..	2	27	0.82	..	..	1 ..
	7	12	30	7	17	38	..	5	8	0.39	..	..	1 ..
12.viii.43.	7	18	0	7	22	54	..	4	54	0.41	..	..	10 ..
	7	23	30	7	26	28	..	2	58	0.67	..	Small.	1 ..
	7	27	0	7	30	37	..	3	37	0.55	..	..	0 ..
	7	31	15	7	35	12	..	3	57	0.51	..	Large.	2 ..
	7	36	45	7	40	12	..	3	27	0.58	..	Small.	1 ..
	7	40	45	7	43	54	..	3	9	0.63	..	Large.	0 ..
	7	44	30	7	49	0	..	4	30	0.44	..	..	1 ..
	7	49	20	7	52	34	..	3	14	0.62	..	..	1 ..
	7	58	0	8	1	12	..	3	12	0.63	..	..	0 ..
	8	2	0	8	6	15	..	4	15	0.47	..	Small.	1 ..
12.viii.43.	6	52	20	6	54	42	..	2	22	0.84	..	Large.	1 ..
	6	55	50	6	58	27	..	2	37	0.76	..	..	3 ..
	6	59	0	7	0	58	..	1	58	1.02	..	Small.	1 ..
	7	1	45	7	3	24	..	1	39	1.21	..	Large.	1 ..
	7	4	3	7	6	8	..	2	5	0.96	..	..	0 ..
	7	7	0	7	9	15	..	2	15	0.89	..	..	4 ..
	7	10	50	7	12	12	..	1	22	1.46	..	..	1 ..
	7	12	50	7	14	30	..	1	40	1.20	..	..	1 ..
	7	15	0	7	16	57	..	1	57	1.03	..	Small.	1 ..
	7	17	50	7	20	41	..	2	51	0.70	..	Large.	1 ..
	7	21	20	7	25	32	..	4	12	0.48	..	..	7 ..

Date.	Commencing time.			Finishing time.			Dist. in feet.	Time taken.		Speed in in./sec.	Wind.	Remarks : Type of ant, load, etc.
Hr.	Min.	Sec.	Hr.	Min.	Sec.			Min.	Sec.			
14.viii.43.	7	26	46	7	29	45	"	2	59	0.67	"	Large. 0
	7	30	20	7	36	20	"	6	0	0.33	"	" 8
	7	37	0	7	41	47	"	4	47	0.42	"	Small. 1
	7	42	30	7	46	28	"	3	58	0.50	"	" 0
	7	47	0	7	51	20	"	4	20	0.46	"	Large. 0
	7	54	0	7	58	33	"	4	33	0.44	"	" 8
	7	59	0	8	3	28	"	4	28	0.45	"	Small. 1
	8	4	0	8	6	52	"	2	52	0.70	"	Large. 0
	8	7	40	8	11	51	"	4	11	0.48	"	Small. 1
	6	39	30	6	41	45	"	2	15	0.89	None.	" 1
	6	42	20	6	44	20	"	2	0	1.00	"	Large. 2
	6	45	0	6	47	36	"	2	36	0.77	"	" 2
	6	49	20	6	51	30	"	2	10	0.92	"	" 1
	6	52	0	6	53	57	"	1	57	1.03	"	" 1
	6	54	30	6	56	48	"	2	18	0.87	"	" 1
	6	57	20	6	59	37	"	2	17	0.88	"	Small. 1
	7	0	20	7	3	17	"	2	57	0.68	"	Large. 4
	7	4	0	7	6	21	"	2	21	0.85	"	" 2
	7	7	30	7	9	50	"	2	20	0.86	"	Small. 1
	7	10	30	7	13	38	"	3	8	0.64	"	" 2
	7	14	30	7	17	59	"	3	29	0.57	"	Large. 3
	7	18	30	7	21	37	"	3	7	0.64	"	" 1
	7	22	30	7	24	48	"	2	18	0.87	"	" 1
	7	25	30	7	28	0	"	2	30	0.80	"	Small. 1
	7	28	30	7	32	0	"	3	30	0.57	"	Large. 2
	7	32	30	7	37	42	"	5	12	0.38	"	Small. 3
	7	38	30	7	40	54	"	2	24	0.83	"	Large. 2
	7	41	30	7	45	24	"	3	54	0.51	"	" 1
	7	46	0	7	48	0	"	2	0	1.00	"	" 2
	7	48	20	7	53	36	"	5	16	0.38	"	" 1
	7	54	0	7	57	7	"	3	7	0.64	"	" 2
	7	59	30	8	5	15	"	5	45	0.35	"	Small. 2
	8	5	45	8	9	3	"	3	18	0.60	"	Large. 2
	8	9	30	8	13	30	"	4	0	0.50	"	" 2
16.viii.43.	6	45	0	6	46	48	"	1	48	1.11	Slight.	" 2
	6	47	30	6	49	30	"	2	0	1.00	Back.	" 1
	6	50	20	6	52	12	"	1	52	1.07	Wind.	" 1
	6	52	45	6	54	47	"	2	2	0.98	"	Small. 2
	6	55	20	6	57	15	"	1	55	1.04	"	Large. 2
	6	57	30	7	0	37	"	3	7	0.64	"	Small. 2
	7	1	0	7	3	12	"	2	12	0.91	"	" 1
	7	5	45	7	8	13	"	2	28	0.81	"	Large. 2
	7	8	45	7	11	45	"	3	0	0.67	"	Small. 2
	7	12	15	7	15	52	"	3	37	0.55	"	Large. 3
	7	16	45	7	19	16	"	2	31	0.79	"	Small. 2
	7	19	45	7	23	55	"	4	10	0.48	"	" 3
	7	26	0	7	29	46	"	3	46	0.53	"	Large. 2
	7	27	0	7	36	0	6½	9	0	0.14	"	" 14
	7	30	15	7	34	45	10	4	30	0.44	"	" 2
	7	35	10	7	38	12	"	3	2	0.66	"	" 1
	7	39	0	7	40	57	"	1	57	1.03	"	" 1
	7	42	30	7	45	41	"	3	11	0.63	"	" 2
	7	47	6	7	50	30	"	3	24	0.59	"	Small. 2
	7	59	0	8	3	5	"	4	5	0.49	"	Large. 2
17.viii.43.	8	4	0	8	7	8	"	3	8	0.64	"	Small. 0
	8	8	45	8	10	44	"	1	59	1.01	"	Large. 0
	8	11	0	8	14	53	"	3	53	0.51	"	" 1
	6	52	0	6	53	45	"	1	45	1.14	Calm.	" 1
	6	54	25	6	56	0	"	1	35	1.26	"	" 0
	6	56	30	6	58	8	"	1	38	1.22	"	" 1
	6	59	0	7	0	52	"	1	52	1.07	"	" 1

Date.	Commencing time.			Finishing time.			Dist. in feet.	Time taken.		Speed in in./sec.	Wind.	Remarks : Type of ant, load, etc.
	Hr.	Min.	Sec.	Hr.	Min.	Sec.		Min.	Sec.			
	7	1	20	7	2	55	"	1	35	1.26	"	Small. 2 "
	7	3	15	7	5	30	"	2	15	0.89	"	Large. 2 "
	7	7	30	7	11	0	"	3	30	0.57	"	" 3 "
	7	11	30	7	14	24	"	2	54	0.69	"	" 2 "
	7	15	0	7	17	0	"	2	0	1.00	"	Small. 1 "
	7	17	30	7	20	33	"	3	3	0.66	"	Large. 1 "
	7	20	50	7	23	12	"	2	22	0.85	"	" 1 "
	7	23	45	7	26	50	"	3	5	0.65	"	" 2 "
	7	27	10	7	29	55	"	2	45	0.73	"	" 1 "
	7	30	0	7	32	42	"	2	42	0.74	"	" 1 "
	7	33	0	7	35	40	"	2	40	0.75	"	Small. 1 "
	7	36	25	7	38	53	"	2	28	0.81	"	Large. 1 "
	7	39	0	7	42	25	"	3	25	0.59	"	Small. 2 "
	7	42	45	7	45	41	"	2	56	0.68	"	" 1 "
	7	46	30	7	50	2	"	3	32	0.57	"	Large. 1 "
	7	51	0	7	54	23	"	3	23	0.59	"	Small. 1 "
	7	55	0	7	57	18	"	2	18	0.87	"	Large. 1 "
	7	57	45	8	1	12	"	3	27	0.58	"	Small. 2 "
	8	1	50	8	3	48	"	1	58	1.02	"	Large. 1 "
	8	4	10	8	6	12	"	2	2	0.98	"	" 0 "
	8	6	30	8	9	8	"	2	38	0.76	"	" 0 "
22.viii.43.	6	44	0	6	46	10	"	2	10	0.92	Side.	" 1 "
	6	47	6	6	50	12	"	3	12	0.62	"	" 1 "
	6	50	20	6	53	25	"	3	5	0.65	"	" 3 "
	6	54	0	6	56	10	"	2	10	0.92	"	" 2 "
	6	56	45	7	0	55	"	4	10	0.48	"	" 2 "
	7	1	0	7	5	10	"	4	10	0.48	"	" 1 "
	7	5	30	7	8	0	"	2	30	0.80	"	" 1 "
	7	8	15	7	11	52	"	3	37	0.55	"	" 1 "
	7	12	10	7	14	53	"	2	43	0.74	"	" 1 "
	7	23	30	7	26	50	"	3	20	0.60	"	" 1 "
	7	27	20	7	31	10	"	3	50	0.52	"	Small. 1 "
	7	31	45	7	34	4	"	2	19	0.86	"	Large. 1 "
	7	34	45	7	38	5	"	3	20	0.60	"	" 3 "
	7	39	0	7	43	30	"	4	30	0.44	"	Small. 2 "
	7	44	0	7	46	24	"	2	24	0.83	"	Large. 0 "
	7	46	45	7	49	10	"	2	25	0.83	"	" 1 "
	7	51	0	7	54	12	"	3	12	0.62	"	" 1 "
	7	55	10	7	57	0	"	1	50	1.09	"	" 0 "
	7	57	10	7	59	11	"	2	1	0.99	"	" 1 "
	8	0	0	8	2	7	"	2	7	0.94	"	" 0 "
28.viii.43.	7	5	0	7	8	15	"	3	15	0.62	Head.	" 1 "
	7	8	45	7	11	30	"	2	45	0.73	"	" 2 "
	7	12	0	7	15	52	"	3	52	0.52	"	" 2 "
	7	16	0	7	20	48	"	4	48	0.42	"	" 1 "
	7	21	0	7	25	23	"	4	23	0.46	"	Small. 1 "
	7	26	0	7	28	12	"	2	12	0.91	"	Large. 1 "
	7	30	0	7	33	6	"	3	6	0.65	"	Small. 1 "
	7	33	45	7	37	35	"	3	50	0.52	"	Large. 1 "
	7	38	0	7	42	0	"	4	0	0.50	"	" 2 "
	7	42	16	7	46	35	"	4	19	0.46	"	" 1 "
1.ix.43.	7	11	50	7	15	10	"	3	20	0.60	Side.	Small. 1 "
	7	15	30	7	18	52	"	3	22	0.59	"	Large. 0 "
	7	19	30	7	22	12	"	2	42	0.74	"	Small. 1 "
	7	23	0	7	26	3	"	3	3	0.66	"	" 1 "
	7	26	20	7	29	45	"	3	25	0.59	"	Large. 1 "
	7	30	0	7	34	0	"	4	0	0.50	"	Small. 1 "
	7	34	10	7	37	38	"	3	28	0.58	"	Large. 1 "
	7	38	0	7	41	25	"	3	25	0.59	"	" 2 "



From this table there are several interesting results which emerge. First, each individual ant varies its speed according to the particular circumstances; a small ant may travel quicker than a larger one over a given distance because it is carrying nothing and the larger one may possibly be carrying a load, or there may be no such cause, the individual ant may be more "interested" in its immediate surroundings than its fellows and will therefore travel more slowly on that account.

The effect of the wind seems to be of less account than might be expected unless it is strong and the burden being carried by the ant is not compact and is in such a form as to be easily "caught" by the wind. Ants carrying a piece of grass stalk  $\frac{1}{2}$  in. long are affected by the wind more than those carrying a smaller piece in a horizontal position. The same applies to the number of grass seeds on a stalk, the more there are on a stalk, the more likely are the ants to carry it in an upright position or drag it, so that apart from weight there is also the increased wind resistance to overcome in these cases. Therefore the method used by the ants in carrying their load is of consequence in regulating their speeds.

From observations detailed in Table I it will be seen that the highest speed recorded was on 26th July 1943 by one large ant carrying one grass inflorescence with one seed attached; this speed was 1.30 inches per second. The slowest speed was recorded on 16th August 1943 when one large ant carrying a grass-head bearing 14 seeds took nine minutes to cover a distance of 6 ft. 6 in. at an average speed of 0.14 inches per second. Other slow speeds recorded by these ants carrying one seed were on 26th and 28th July 1943 when small ants proceeded at speeds of 0.37 and 0.32 inches per second. It is worthy of note and also to illustrate the individuality of these speeds that on the same day, namely 26th July 1943, the fastest and one of the slowest speeds were recorded, the former by a large ant and the latter by a small ant each carrying one seed.

Although it is unsafe to generalise and to take averages from these results, it would seem that, as the stream of ants passes along its trackway, some carrying loads and some empty, some small and some large ants, it may be stated that, at the times and under the conditions prevailing at the time, their average speed was in the region of 0.65 inches per second, which compares favourably with the observations on ants emerging from their nests quoted at the beginning of this paper. To state more than this is perhaps unsafe as the individual speeds are governed by so many factors.

I wish to thank Mr H. St J. K. Donisthorpe for naming the ants for me.

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### COLLECTING NOTES.

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SPRING NOTES FROM EAST TYRONE, 1946.—The months of February, March and early April were exceptionally warm and mild, wind mostly south or west; *Colostygia multistrigaria* was out in numbers towards the end of February; *Aglaia urticae* and *Nymphalis io* appeared after their winter sleep on 13th March, and *Alsophila aescularia* was common at light. On 1st April thirty *Selenia bilunaria* were attracted, all males; the local form is fine and distinctly marked. At light also later

in the month the following were taken or observed—*Colostygia salicata* and numbers of *Europhila badiata* and *Nothopteryx carpinata*; of *Noctuae* the following also turned up—*Xylena exsoleta* (rare here at light), *Xylocampa areola*, *Orthosia incerta*, and *O. gracilis*.

On a nearby bog *Gymnoscelis pumilata* was flying in swarms at dusk over Gorse on 13th April. Usually this little Pug is very local and not common in this district. In Co. Donegal it is often frequent by day flying over heather.

Since the middle of April the weather has been very cold with north-east winds and a long drought of almost two months; this accounts for *N. io* still in good condition on 10th July and *Euchloë cardamines* ♀ on the same date in fresh condition.—THOMAS GREER, Cookstown, N. Ireland.

HERSE CONVULVULI IN SCOTLAND.—I have to record the capture of a specimen of *Herse convulvuli* at Elderslie, Renfrewshire, on the 10th of September this year. It was taken during the day in the garden, near the window to which it had presumably been attracted the night before. It is interesting to note that last year on the 11th August a specimen of this moth was taken near Johnstone a few miles from Elderslie.—ALAN M. MACLAURIN, "Oldhall House," Kilmacalm, Renfrewshire, 2nd October 1946.

IMMIGRANT LEPIDOPTERA IN THE INNER AND OUTER HEBRIDES, IN 1946.—This season has been a very poor one in the Western Isles for such species. On 14th April, a single *Vanessa cardui* was seen on the Isle of Rhum flying vigorously across the moorlands in the vicinity of Cave Bay. Later, on 31st July, in the same island an odd example of its congener, *V. atalanta* appeared in the north side of Loch Scresort, whilst on the same day half a dozen of the same species were observed at Kinloch as they probed the blossoms of the privet there. Larvae of *Pieris brassicae*, in very small numbers compared with the masses of 1945, occurred on turnip. No evidence existed that these were the progeny of spring immigrants; in fact as living pupae had been detected on Rhum in April, it seems in every way likely that these were the descendants of the 1945 horde. Throughout our stay in July and August, *Plusia gamma* dashed across the heather, although only odd individuals were so observed. On the Isle of South Uist and on Benbecula, larvae of *Pieris brassicae* were common enough on cabbage, whilst *Plusia gamma* flew sparsely over moor and machair from Lochboisdale in South Uist to Gramsdale on Benbecula.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE BUFF ERMINE (*SPILOSOMA LUTEA*) IN THE HEBRIDES.—Last year I was able to report the "Buff Ermine" for the first time from the Outer Isles. This caused me to make vigorous efforts to increase, if possible, the knowledge of its range in the area. The work commenced on the Isle of Rhum where I discovered the larvae in abundance on bracken, with those of *Phragmatobia fuliginosa*, under the cliffs along the north side of Loch Scresort, and on the edge of the outermost pine wood. On South Uist, it was beaten from the same food plant with *Arctia caja*, *P. fuliginosa*, *Diatraea oleracea* and *Phlogophora meticulosa* in its original station at Arinambane along the north shore of Loch Eynort.



Later, in the gorge of the Allt Volagir, I discovered what had been apparently an old rock shelter in which a colony of nettles had long been established. These supported a brood of *Spilosoma lutea* as well as crowds of the Psyllid, *Trioza urticae*. Curiously enough, the whole of the Allt Volagir larvae were in their first instar whilst those from bracken at Arinambane, as well as some taken later from burdock, were ready for pupation on 28th August.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

TIME OF APPEARANCE AND THE FOOD-PLANTS OF *OPISTHOGRAPTIS LUTEO-LATA* ON THE ISLE OF RHUM.—In North Durham, this species occurs normally in May but straggles into June. However, on the Isle of Rhum, where insects are *earlier* than with us, it is always on the wing in August. In fact, I have beaten its larvae from hawthorn on several occasions in May and June on Rhum, and these have pupated in the middle of the latter month. On 2nd August 1946, the species occurred in plenty on the island at a point where no hawthorns existed. I therefore took a torch to observe the females ovipositing at night time. To my surprise I found that they were completely attached to a big thicket of cherry laurels, *Prunus laurocerasus*, a plant one would scarcely have expected to be chosen as a food-plant, although it does belong to the *Rosaceae*. Perhaps it is worth noting that I have captured the Brimstone moth in August in Co. Tyrone, Ireland.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE RANGE OF THE "GREEN VEINED WHITE" ON THE ISLE OF SOUTH UIST.—Since we first added this butterfly to the recorded fauna of the Outer Hebrides, we have been able to report it as occurring from Barra to Benbecula. However, we thought it to be limited in its South Uist habitats to the lochs in the transition zones between machair and moorland. In August this year (a very fine month!), we were obliged to revise all of our previous ideas, for the insect was common enough on the machair at Bornish, where it fed on water cress, along the north side of Loch Eynort attached to *Cardamine pratensis* and *C. flexuosa*, on the Allt Volagir with the same two plants as its food, and quite unexpectedly, at a very remote station, opposite Stuley Island, only approachable, as far as we were concerned, from the sea. There it flourished in abundance with water-cress as its sole pabulum.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

SPECIES = *AEGERIA BEMBECIFORMIS* ON THE ISLE OF RHUM.—In 1945, the "Lunar Hornet Moth" was observed for the first time in the Hebrides. This year its larvae were of common occurrence on stems of *Salix aurita* growing along the burn which flows down Barkeval into Loch Scresort. In August, when chopping firewood we found larvae and larval burrows in the trunks of the osier, *Salix viminalis*.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

THE WOOD WASP (*SIREX* = *URO CERUS GIGAS*) IN RHUM AND AT MALLAIG, INVERNESS-SHIRE.—This insect was noted flying along the Kinloch Burn, Isle of Rhum, and, by a strange coincidence, was sent from Mallaig on the mainland for identification the following day.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.



## EXCHANGES.

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NOTES ON THE ASPARAGUS BEETLE (*CRIOCERIS ASPARAGI*, L.).

## PART III: MISCELLANEOUS ANATOMY.

By BERNARD VERDCOURT, B.Sc.

Plates XIX, XX.

13 820  
JAN 20 1941

A. *Genitalia*.—During the work on variation it was found that recognition of the female was easy if ethyl acetate was used as the killing agent. Under these circumstances the external genitalia are protruded and the two hairy external lobes are particularly prominent. A diagram is given in Fig. 3. In this species the male genitalia are not exerted, though it has been observed to occur in other beetles. It might be stated here that in the opinion of the author ethyl acetate is the most useful killing agent available. Chloroform and ether tend to produce stiffness and potassium cyanide is a nuisance in many ways. Most insects remain relaxed for many days when killed with ethyl acetate, though it does not seem to be suitable for Diptera. The oedeagus is illustrated in Figs. 5 and 6.

B. *Wings*.—These are well developed and the insect readily takes to flight at certain times though usually it drops to the ground when touched. An interesting behaviour was noted which is probably of protective value. A beetle will frequently remain motionless on one of the narrow stems of the asparagus, perpendicular to the axis. If an object is now placed above the insect it will rotate to the opposite side of the stem and remain out of sight. This was observed to happen almost invariably. The wings are of typical cautharid type and are illustrated in Fig. 1.

C. *Elytra*.—The tracheation of the elytra was worked out and is shown in Fig. 4. It is interesting to compare this with the wing venation. There would appear to be little resemblance though Imms quotes Comstock as saying that there is a close similarity. Fig. 4 shows the courses of the main tracheae as seen from the ventral side of the elytron and many branches of the epipleural and sutural tracheae are doubtless omitted. The main tracheae are tubes roughly of diameter 10.4  $\mu$ m. and the branches vary from 1/5th to 1/10th of this figure at their widest. Whereas wings are extremely simple to mount and examine, the elytral tracheae are by no means easy to trace. When mounted in a non-aqueous medium only the main tracheae are at all visible. The smaller branches are, however, fairly easily visible if mounted with air entrapped. Glycerin jelly is a suitable mountant or they may be mounted dry. Several slides have to be made up before the whole system is evident. The position of the main tracheae is also shown in Fig. 7, which is a very diagrammatic section of an elytron taken at one third of the way from the base. The reticulate layer shown in Fig. 7 is also illustrated in Fig. 2. In the centre of the elytron there are two definite layers of very different structure. The ventral reticulated one is thin and the appearance is due to blunt circular granules which uniformly cover the layer. Fig. 2 is a photomicrograph of a small portion of the central section of an elytron. The broken edges allow the two layers to be seen fairly readily. More detailed structure of the elytra will be described later.

**THE SEASON OF 1946 IN WEST SURREY.**

By Colonel V. R. BURKHARDT, D.S.O., O.B.E.

Anyone domiciled within a few miles radius of Godalming is in a good collecting centre. To the south lies Chiddingfold, on the western edge of the broad strip of Wealden clay, whose oak copses, woods, and forests stretch far beyond Horsham. These have been heavily cleared for timber during the war and the sunlight has stimulated the undergrowth, which forms the food plant of the Fritillary larvae. In almost every recently felled copse *Brenthis* (*Argynnis*) *euphrosyne* and *B. (A.) selene* are to be found.

To the east and west of Godalming is a belt of sand and heather, from Frensham to Hurt Woods, and colonies of *Plebejus* (*Aegon*) *argus* and *Aphantopus hyperantus* are not infrequent. A few miles to the north lie the Downs, from Dorking to Farnham, where the chalk peters out at the western extremity of the Hog's Back. The South Downs are within easy motoring distance, for *Polyommatus* (*Lysandra*) *coridon* and *P. (L.) bellargus*.

The month of April was warm and sunny, and, on 1st May, 50 *Argynnis euphrosyne* ♂♂ were counted. A good number of *Anthocharis cardamines* ♀♀ were on the wing, numbers of them very small, and the ♂♂ conspicuous by their absence. Several *Leptidea sinapis* ♀♀ were seen near Chiddingfold on 3rd May, and two clearings visited produced 70, and 30 *A. euphrosyne* respectively. On the following day the first aberration was recorded, a heavily banded ♂ (C.R.). On the 7th a *confluens* ♂ was netted, and a freshly emerged "cream" ♂ (V.R.B.).

By the 9th *Leptidea sinapis* were plentiful, and several *Pararge megera* ♂♂ were seen. *Erynnis tages* was becoming common, and *A. euphrosyne* rapidly increasing in numbers. On the 10th a good banded aberration of the latter was missed. A blistering north-east wind made collecting difficult and the insects were not co-operative. Rides, as a rule, are narrow and overgrown, and the bugle is more abundant in nooks between the hazel bushes. There is consequently no tendency for *B. euphrosyne* to exhibit themselves in the shop window, and they are excessively wild in the jungle. On 11th May *Callophrys rubi* was first seen, and *Coenonympha pamphilus* was in some numbers. A worn *A. euphrosyne* ♂ was taken (V.R.B.) and a fresh one of *confluens* (C.R.). On the following day a minor aberration with black centre was captured (V.R.B.).

On 15th May *Hamearis lucina* appeared, but does not seem to have been in any abundance this season. A very good *confluens* ♀ of *A. euphrosyne* was taken (C.R.). A heavy ground frost in the night killed off numbers of *Leptidea sinapis*, and there appeared to be a considerable shortage of *A. euphrosyne* on the following days. *B. (A.) selene* became more numerous, and a dozen were seen, the first having been noted on the 9th. On 16th a very good melanic ♀ of *A. euphrosyne*, just emerged, and of unusual type, was taken (C.R.). A melanic *Erynnis tages*, corresponding in colour to f. *popoviana* (Nordm., Seitz) was captured (V.R.B.) next day. The first *Euphydryas aurinia* was seen on the 19th. The district abounds in scabious and single specimens are to be picked up in most of the copses. Only three or four real colonies



were discovered, none very strong. On the 22nd an *A. euphrosyne* with eight symmetrical white spots (three on each forewing and one on each hind) was taken (V.R.B.) and a slightly worn white ♂ (C.R.). This was capped by a freshly emerged ♀ "cream" (C.R.) on the 28th. On the following day over 100 *A. selene* were counted in a small area, and a *confluens* ♂, with good underside, was netted. A remarkable ♂ *E. aurinia*, almost entirely black on all four wings, except for very small areas of fulvous red, was taken by V.R.B. An extreme wild aberration of this species is, I understand, very rarely captured. On the 30th a single specimen of *Colias hyale* was seen and pursued unsuccessfully for some distance along the road, before it took refuge in a garden.

Apart from cold north-east winds, the weather during the month was propitious for collecting and it was possible to be out on 75% of the days.

If May was favourable, June was the very reverse. On the first few days cloudy weather prevailed and entomologists anticipating a recurrence of 1945 crop of aberrations were disappointed. Insects were few in number and varieties scarcer still. On the 3rd an all-black aberration of *A. euphrosyne* ♀ was captured by C.R. after it had once evaded him. The sun was never strong enough to make the ♀♀ of *Euphydryas aurinia* fly, so a search in hopes of getting a ♀ to match the melanic ♂ was fruitless. Long periods of heavy cloud, with very brief, sunny intervals, continued till the middle of the month. The only further aberration of *A. selene* taken was a *confluens* ♀ on the 12th. From this date onwards it was noticeable that emergences of this species were very small in size, like those of the second brood, and there was absolutely no variation.

A visit to the North Downs on 13th was disappointing, as only two *P. (L.) bellargus* ♂♂ were seen and about thirty *P. icarus*, though the slopes were yellow with comosa flower and great clumps of *Lotus corniculatus* were everywhere to be seen. The first *Maniola jurtina* ♂ was noted.

On 26th June *A. cydippe* appeared, and two days later the first *A. paphia* and the summer brood of *Polygonia c-album*. *A. cydippe* was in short numbers, and *A. aglaia* extremely scarce. It was not in its usual haunt on the chalk downs and only an odd specimen was met with in the woods.

An *Aglais urticae*, variety *connexa*, was taken on the 1st July (V.R.B.). Buchan's fourth cold period turned out to be a heat wave. *Aphantopus hyperantus* appeared on 4th and one *V. cardui* and a single *V. atalanta* were seen on the same day. *Limenitis camilla* was late, the first being observed on the 6th of the month. This insect, and *A. paphia*, were widely spread, but never in any great congregations. The only aberration of the latter seen was a crippled ♂ with two white spots on the forewings, where the scaling had failed. *A. hyperantus* seem to offer the most profitable field of investigation and was found in considerable numbers. It was never so dense as in the New Forest rides, but by skirting hedgerows near the copses it was possible to net and examine fifty an hour. The insects exhibited a strong instinct of self-preservation and for every one bagged half-a-dozen took refuge in



the hazel bushes. During the extreme heat only the ♂♂ were on the wing and the habits of the ♀♀ were quite unpredictable. As far as one could judge they selected a shady spot with a leaf overhead to preserve their complexions and gave their husbands a pink ticket to join a flying club. A considerable number of forms were found, from *lanceolata* (two) to *caeca* (one). Three *transformis*, all cripples, were taken on the 14th. One very good *crassi puncta* was taken on the 23rd (V.R.B.) and on the same day a good example of *V. cardui*, ab. *ker-shawi*, with small spots on the hindwings, centred with blue, was taken at Chiddingfold. The second brood of *Leptidea sinapis* was noted on this day and on the 24th *Nymphalis io* appeared. *Celastrina argiolus*, summer brood, was first seen on the 25th and a *Polygonia c-album* with an unusually large black basal area on the hindwings was taken in the evening. *Maniola tithonus* was first seen on the 14th July but was not at all abundant till the end of the month, when ♂♂ were full out, but ♀♀ were still scarce. A ♂ with two extra ocellated spots on each forewing was captured on 8th August. This species was never in great numbers, though a hundred could be looked over in the hour.

The first few days of August were fine and a strong colony of *L. coridon* was found on the North Downs, but extremely little variation was noted. The weather broke on the 7th and a sunny day was exceptional for the next six weeks. A single visit to the Winchester area produced several *obsoleta* forms. A week was spent in the Shoreham area from 10th to 16th but strong gales, accompanied by heavy rain, made collecting next to impossible. At the usual Shoreham locality insects were scarce and worn, though it was reported that some good varieties had been taken about the 1st of the month. A very strong colony was worked nearby, but, though as many as two hundred emergences per diem were counted, all were strictly true to type. There was an almost complete absence of *Colias croceus* during the month and no ♀♀ were seen till 15th September.

The second brood of *P. icarus* was first observed on 5th August but, though it was on the wing till 12th September, it was never found in abundance. *Heodes phlaeas* was even scarcer, both on the downs and in the Weald. The larvae of the Spring brood appear to have been better weather prophets than the Meteorological Department, for only a very small proportion fed up and pupated, the remainder deciding to defer their development till the long winter was over.

Though the first bred *Pararge megera* emerged on 2nd August, the autumn brood was late and scarce. A ♂ with a double apical spot was taken in good condition on 24th. *Gonepteryx rhamni* was about a fortnight late and in fair abundance. It remained much longer on the wing than usual and was still feeding up for the winter in numbers on 28th September.

A visit to the South Downs for *P. (L.) bellargus* (from 9th to 16th September) was disappointing. ♂♂ were worn and the colonies greatly reduced in numbers. A small and unusually dark race of *M. jurtina* was found in fair abundance.

In the Chiddingfold area the "Hairstreaks" seem to have been a complete failure. Intensive beating only produced six larvae of *Thecla quercus* and a dozen of *Ruralis betulae*, but only one imago of the latter emerged. A single *R. betulae* was observed on the wing on 25th August.

*Polygonia c-album* were in fair numbers, and were still feeding on scabious up to 11th October. Although there was a good brood of *Nymphalis io*, which was flying from 24th July till the end of September, the *Vanessidae*, *atalanta* and *cardui* were in short supply, and no autumn larvae of *Aglais urticae* were in evidence in the neighbourhood.

## SEX BRANDS IN IDEOPSIS GAURA, RACE PERAKANA, FRUH. (DANAIDAE).

By L. RICHMOND WHEELER, Ph.D., M.Sc., F.L.S.

1. GENERAL. Distant ((1882), p. 8) said that there was no male sex mark or scent-gland on the posterior wings and distinguished the sexes only by the shape of their wings and by the female being somewhat larger on the average. Corbet and Pendlebury ((1934), p. 118) mentioned the more rounded wings of the female and stated that it is whiter than the male. Fruhstorfer ((1927), p. 215) spoke of "very striking sexual dimorphism," but only alluded to modified scales along the submedian of the male hindwing and "slight" development of androconia as characters shared with his *Radena* group of *Danais*, and a difference in the shape of the antennal clubs in the sexes of *Ideopsis* (*l.c.*, pp. 211, 216). As he agrees with other observers that the male *Ideopsis* does not possess the abdominal hair-pencils found in other Danaid genera, it is not clear why he regarded the sexual differences as being so remarkable. Apart from the sex-glands described below, the males and females in this species are not always easily distinguishable. For, as Distant noticed, the male forewings vary considerably in shape, as indeed, do those of the females; when in Malaya I did not find the females noticeably larger or whiter; the antennal clubs do not differ much in this species; and none of these authors mention any female sex markings.

2. MALE. It is only lately that I have observed that the males can be picked out at a glance by the vein 1 (submedian) on their hindwing being much broader and less sharply defined than it is in the opposite sex. This modification of a single vein is quite different from the broad, brownish stain on the inner, dorsal, portion of the hindwing of the "*D. similis* L." included in Fruhstorfer's *Radena* group. The distinction between the sexes of *Ideopsis* in this vein is clearly shown in Seitz' plate 76a for the subspecies *costalis*, Mre.

3. FEMALE. Male brands and glands are very common in Danaidae and most other butterfly families. It is, therefore, more interesting to find that the female *I. gaura*, race *perakana* possesses distinctive brands, not present in the male, which appear to have escaped notice up to the present. They occur on the forewing above, as thickenings of the inner (proximal) portions of veins 2 and 3; the latter also fuses with the veins bounding the distal end of the cell and with the large spot at the base of vein 4 there. But this spot, like others on *Ideopsis*, male and female, is definitely black; whereas the female sex markings, like the male, are dark brown, and thus distinguishable in good light from the black spot, though this is not apparent in Seitz' figure of the female *perakana* (*l.c.*). These thickenings are shown there and on the *costalis* female in ordinary black. These remarks apply also to Distant's figure (i, 4).



4. COMPARATIVE. It may be added that none of these structures occur in *Hestia* species; and in most *Danais* species the hindwing male glands form small patches, sometimes pouches, on veins 1 and 2. Thus *Ideopsis* appears to present special features in the female. In the male it resembles *Danais* slightly and its *Radena* group more closely. In both sexes it is more sharply contrasted than was realized before as regards secondary sexual characters from the *Hestias* to which *I. gaura*, race *perakana* has such considerable resemblance in general appearance and habits despite its smaller size. I can confirm Martin's statement that it consorts closely and frequently with *H. lineata*, Btlr., in Penang, usually about 1500 feet up the hill.

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### TUKDAH DIARY, SEPTEMBER-NOVEMBER 1945.

By D. G. SEVASTOPULO, F.R.E.S.

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#### INTRODUCTION.

Readers of the *Entomologist's Record* have been taken so often on collecting trips to the Continent that I am venturing to take them on a still longer journey, to Tukdah in the Himalayas.

As is so often the case in India, things are not as they seem, and Tukdah is really not Tukdah at all, but Hum. Tukdah proper is a village some three miles away to the west and over the next ridge. Our Tukdah, or Takdah as it is sometimes written, was formerly a military cantonment and the name was taken by the military when the cantonment was established. The cantonment was abandoned in the late twenties and the place is now a small holiday station.

Tukdah is situated some twelve miles to the east of Darjeeling, at a height of about five thousand feet, and is reached by a road leading off from the main Ghoom-Kalimpong Road. The country is partly forest, mainly *Cryptomeria* and hardwoods, the former without much undergrowth, the latter with plenty, and partly open hill-side, where maize and vegetables are cultivated.

My visit was planned to escape the monsoon, which normally ends about the middle of September, but this year, however, monsoon conditions continued well into October, and then, just as the weather was clearing, we had a further week of rain due to a cyclone in the Bay of Bengal.

The general impression that these hills are very rich in butterflies is not correct. The number of species occurring is, of course, far greater than in England, but I very much doubt if the number of individuals seen is as many. The valley bottoms are another story. In 1928 I did a round trip to Phalut and I shall never forget the abundance of butterflies in a field of flowering buckwheat at a place called Singla Bazar in



the Rungeet Valley—every head seemed to hold one or more butterflies—and a friend once told me that he had counted well over a hundred species of butterfly during a picnic lunch on a shooting trip in the Teesta Valley. A field of flowering buckwheat in Tukdah held fewer butterflies than a meadow in England.

As regards moths, my catch was disappointing. Light was an almost complete failure. This was partly due to weather and partly to the strict rationing of kerosene. The weather during the first half of the visit was rainy and misty; once it cleared it got cold, and a cold north breeze seemed to keep moths to the shelter of the forest. The kerosene rationing prevented working late and also prevented the use of an incandescent type of lamp, consequently the light was not very bright. It also, naturally, prevented the taking of a lamp into the forest and the bungalow itself was badly placed for collecting with light. Like most of the houses at Tukdah, the bungalow was built on a shelf cut out of the hill, the back being only a few yards from the hill itself and the front having a small garden consisting of a fifteen-yard-wide gravel strip with a border of flower beds, the hill then falling away again to the house below.

The meagre nature of the daily catches of moths may cause some surprise, but it must be remembered that the conditions in the Himalayas are very different from those in England. The density of the undergrowth makes beating very unproductive and the steepness of the hillside prevents anything that flies any distance being caught. Searching produces a few specimens, but the main source of collecting must always be light, which failed me on this occasion. In Darjeeling some years ago I took a hundred species of moths at light in three evenings.

For the benefit of anyone who collects at Tukdah in the future, the following were my main collecting centres. The "forest road" is the car road connecting Tukdah with the main Ghoom-Kalimpong Road, the most productive length being from the Pumong Bend to the top of the branch road that runs down past the Tukdah Club and on to Rungli Rungliot. This stretch is rather sunnier than the portions nearer to Tukdah as the slope on the southern side is very steep and the sun is able to shine over the tops of the trees on to the road. The "open hill road" is the continuation of this same road after passing through Tukdah, through Linding and on past the forest rest house to a local view-point known as the Downs, where a view of the snows of the Teesta River, both before and after it leaves the hills, of Kalimpong and of Peshoke can be obtained. Dr Longstaff visited Peshoke in December 1903 and described his experiences in his book, *Butterfly Hunting in Many Lands*. The "lower forest," usually visited in the afternoon and evening, is the forest on either side of the contour path running from Tukdah to Rungli Rungliot, the scene of the novel of that name, and the "tea" is the upper portion of the gardens of the Rungli Rungliot Tea Estate, where the tea meets the reserve forest.

As regards names, I have followed Evans' *Butterflies of India* (2nd edit.), with the Papilionidae and Pieridae brought up to date with Talbot's *Fauna of British India*, Butterflies, i (2nd edit.) for the Rhopalocera. For the Heterocera, I have followed Hampson's *Fauna of British India*, Moths, i-iv, modernising it with the aid of Bell and

Scott's *Fauna of British India*, Moths, v (Sphingidae), the English edition of Seitz' *Macrolepidoptera of the World*, x, xi and xii, and Hampson's *Catalogue of the Lepidoptera Phalaenae in the British Museum*.

My two months' holiday produced records of 87 species of Butterflies and 237, of which 40 are still unnamed, of Moths; the latter a disappointingly low figure due to the failure of light as a means of collecting, and added the descriptions of some 50 species of larvae and pupae, many of them previously unknown, to the serial paper on "The Early Stages of Indian Lepidoptera" that is being published in the *Journal of the Bombay Natural History Society*. Most of the pupae that I brought down to Calcutta failed to emerge, due, I think, to the difference in atmospheric pressure; in many cases I found that the imago had developed in the pupa but had failed to break out.

In the following pages, the first time a species is mentioned it is given its name in full, generic, specific and subspecific; thereafter it is merely referred to by its specific name. In the list of species given at the end of this paper the names are again given in full. Species that were only obtained in the early stages are marked with an asterisk.

Except for the addition of names, the diary is given as it was written up each day. Any notes added subsequently are enclosed in brackets.

#### THE DIARY.

15th September.—Arrived in a downpour, which continued for the rest of the day. A number of *Siccia (Aemene) taprobanis*, Wlk., and one *Scopula (Craspedia) cleoraria*, Wlk., *effrenata*, Wlk., were resting on the white-washed walls of the verandah. In the evening light, an ordinary paraffin lamp, attracted one male *Dinumma deponens*, Wlk.

16th September.—In spite of heavy rain all night, the verandah was again well tenanted by *S. taprobanis*. It rained hard all the morning but a search of the rose bushes in the garden produced the following larvae:—*Eterusia pulchella*, Koll. (*Soritia leptalina*, Koll.), *Achaea (Ophiusa) melicerte*, Drury, and *Phthonoloba decussata*, Moore. It cleared up in the afternoon and a short stroll produced a female *Jamides bochus*, Cr., *bochus*; *Ypthima sakra*, Moore, *sakra* was flying in numbers and a specimen or two of *Anonychia grisea*, Btlr., were disturbed. A second stroll produced *Zemeros flegyas*, Cr., *indicus*, Fruhs., and *Abisara fylla*, Dbl., sunning themselves in a watery sun, and *Dichromia quadralis*, Wlk., *Asthena plurilinearia*, Moore, and *Calothysanis (Timandra) correspondens*, Hamps., were beaten out. A larva of an unknown Lasiocampid and of a Hemiteid were also found. (The Lasiocampid, which proved fairly common, produced a very Arctiid-like pupa in a slight cocoon spun in soaking wet moss, but all the pupae died on being brought down to Calcutta; the crochets of the prolegs show that it is Lasiocampid and not an Arctiid. The Hemiteid produced an imago, which is still unnamed.) Light again a failure, a single female *Lasiplexia (Euplexia) chalybeata*, Wlk., ab. *albistigma*, Warr., only. Yesterday's rainfall was five inches.

17th September.—A morning walk produced a number of larvae of *Rhagastis albomarginatus*, Roths., *albomarginatus*, a single *Macroglossum troglodytus*, Bsd., and *Eriopus (Callopietria) repleta*, Wlk., and a second specimen of the previously found Lasiocampid. A female



*Euproctis lativitta*, Moore, and an *Eterusia* (*Heterusia*) *aedea*, L., *edocla*, Dbl., were found resting. I caught one *Neptis radha*, Moore, *radha*, a *Heliphorus brahma*, Moore, *brahma*, and a couple of *Aeromachus stigmata*, Moore; a number of *Timora albicilia*, Hamps., and a female *Luxiaria obliquata*, Moore, were found settled on leaves and grasses. A search round the garden produced larvae of *Trabala vishnu*, Lef., *Psyra spurcataria*, Wlk., and *Ectropis* (*Boarmia*) *bhurmitra*, Wlk., on rose, a *Tiracola* (*Arcilasisa*) *plagiata*, Wlk., on *Menispermaceae* sp., a single *E. aedea* and a number of young *Leucoma* sp. on *Camelia* and two *Thyatira batis*, L., on *Rubus*. (The *Leucoma* is probably an undescribed species and agrees with nothing in the British Museum; I found the same larva feeding on tea at Peshoke in December 1936.) Light a complete failure.

18th September.—The weather is definitely clearing up. A walk in the morning through the forest and up the road produced a few *Lethe verma*, Koll., *sintica*, Fruhs., in the forest itself, whilst a few *Limenitis daraxa*, Dbl., and numbers of *Dodona adonira*, Hew., *adonira* were settled on the damp road. *Y. sakra* was in numbers everywhere. A large greenish *Euthalia* was seen, but flew off before it could be caught. Single larvae of a Limacodid (which died), *Diacrisia* (*Spilosoma*) *casigneta*, Koll., *Carea nitida*, Hamps., and *Euphyia* (*Cidaria*) *silaceata*, Schiff., were found. A second female *E. lativitta* and a male *Urapteryx primularis*, Btlr., were found settled on the underside of leaves. This afternoon's walk was a repetition of yesterday's; a good series of *T. albicilia* and an *Epiplema multistrigaria*, Moore, were beaten out of a grassy bank, a *Baoris* and a number of a dark *Euploea* were seen but not identified, an *Ypthima baldus*, F., *baldus* was caught, and a single larva of *Nyctemera plagifera*, Wlk., was found. A stroll after tea produced three larvae of *Loepa katinka*, Westw., five of *R. albomarginatus*, two of *Rhagastis olivacea*, Moore, three of *T. batis*, and a pupa of *Phytometra* (*Plusia*) *orichalcea*, F.; a male *T. vishnu* was found at rest and a number of *Crambus latellus*, Snell., were kicked out of grass. Light produced one female *Eriopus reticulata*, Pag., and a male *D. deponens*, surprising as the moon, about three quarters full, was very bright.

19th September.—A dull morning and very little flying except *Y. sakra*. A very battered *Zeltus etolus*, F., was caught resting on a leaf and a female *Pernia felinaria*, Guen., flying. Larva hunting was successful and produced six *R. olivacea* and one each *Panacra metallica*, Btlr., *metallica*, *T. plagiata*, *Risoba basalis*, Moore, *Thinopteryx crocoptera*, Koll., *Cidaria aurigena*, Btlr., *Cidaria obfuscata*, Warr., and three other Geometers (these latter all died). Most of the afternoon was spent blowing larvae, but a short stroll before tea produced a single *Neptis hylas*, L., *varmona*, Moore, a *Zizeeria maha*, Koll., *maha*, a larva of *R. albomarginatus*, one of *M. troglodytus*, two of *L. katinka*, and three of *R. basalis*. A pupa of *Phytometra albostrigata*, Brem. & Grey, was found and a large black and white *Papilio* was seen but not caught. In the evening larvae of *Phissama* (*Cretonotus*) *transiens*, Wlk., *N. plagifera*, *T. plagiata* and *E. repleta* were found and a female *Asura* (*Mitochrista*) *strigipennis*, H.-S., was caught on a leaf. Light, in spite of a heavy thunderstorm, attracted a single male each of *Dia-*



*crisia* (*Spilosoma*) *multiguttata*, Wlk., and *Cryptoloba cinerea*, Btlr., and a female *Leptomiza calcearia*, Wlk.

20th September.—A fine sunny morning, which soon clouded over so that very little was flying. A few *Mycalesis francisca*, Cr., *sanatana*, Moore, the wet season form, of course, were flying over the undergrowth in the forest, and a number of *Eressa* (*Syntomis*) *lepcha*, Moore, were sitting on bracken fronds. Larva hunting produced five fresh species—*Papilio helenus*, L., *helenus*, *Macroglossum pyrrhosticta*, Btlr., *pyrrhosticta*, *Macrauzata fenestraria*, Moore, *Acronicta indica*, Moore, *Moma champa*, Moore—and *E. repleta*. (Two larval forms of this last species were found, each with a different life-history, the one having a pre-pupational diapause of some three months, the other changing to a pupa two or three days after having spun its cocoon. The imagines from the diapause larvae were slightly smaller and darker than the others, but both have been identified by the Forest Entomologist as this species.) The afternoon was rainy but it cleared up at tea time and a walk afterwards produced three more fresh species of larva—*Notocrypta feisthamelii*, Bsd., *alysos*, Moore, *Orgyia postica*, Wlk., and *Anisodes obrinaria*, Guen. A male *Rhodostrophia vinacearia*, Moore, was knocked out of herbage and a male *Lithosia* (*Prabhasa*) *distorta*, Moore, was found sitting on a leaf. *S. taprobanis* apparently breeds on the lichens growing on the walls of the house as a large number of pupae and a few larvae were found thereon. Light a complete failure

*To be continued.*

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### COLLECTING NOTES.

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ORTHONEURA GENICULATA, MG. (DIPT. SYRPHIDAE) IN HANTS.—On 19.iv.46, at Linford, New Forest, I swept a ♂ of this species from grass in a marshy hollow adjoining a small brook. Verrall, in *British Flies*, viii, pp. 188 and 670, referring to the species as *O. elegans*, Mg., states that "it is rare in Britain," and gives records from Sutton, Birmingham, and Rannoch. The identity of my specimen was kindly confirmed by Mr R. L. Coe.

At the same time and spot, I took that interesting Ephydrid, *Ochthera mantis*, De Geer.—C. N. COLYER, F.R.E.S., 8 Canning Court, Newnham Road, N.22.

TEPHRITIS LEONTODONTIS, DE GEER (DIPT. TRYPETIDAE) IN HANTS.—I am able to record that on 14.vi.46 I swept from nettles beside the R. Avon at Ringwood, Hants, a ♀ of the above, which I understand has been regarded as an essentially northern species in this country. I am indebted to Mr R. L. Coe and to Mr H. W. Andrews for confirming the identity of my specimen.—C. N. COLYER, F.R.E.S., 8 Canning Court, Newnham Road, N.22.

LIMENITIS CAMILLA, L., IN LEICESTERSHIRE.—This fine insect has certainly increased in recent years. I took two specimens near Burbage, Leics., in July last. It is, I believe, nearly 50 years since any other

actual record was made for the above County. It was to be seen commonly in woods north of Sheringham, Norfolk, in July 1939, and has appeared again in Epping Forest, where I saw it both at Chingford and Hainault several times during the last few years.—D. MURRAY, Leicester.

**VOLUCELLA ZONARIA AT EYNSFORD, KENT.**—I should like to record the capture of a *Volucella zonaria* ♂ on 14th August 1946 at Eynsford, Kent, whilst feeding on the flowers of Field Scabious.—K. H. BOBE, 182 Kingsground, Eltham.

**INSECTS ON HALLIVAL, ISLE OF RHUM.**—As I was the only member of our expedition who had not climbed Hallival, I decided to do so on 11th August. The usual insects were taken as we ascended, but after the 1500 feet level was reached very few appeared. However, at a height estimated at 2000 feet, *Aglais urticae* flew in small numbers, accompanied by greater quantities of the characteristic Rhum form of *Colostygia didymata*. Hymenoptera were represented by *Bombus hortorum*, which probed the blossoms of the wild thyme.—J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

**TWO SCARCE MOTHS IN BEDFORDSHIRE.**—Neither of the two species mentioned below appears to have been recorded for Bedfordshire, though since no list has been compiled since 1904 (*Victoria County History*) and much casual collecting has been carried out by numerous people it is impossible to be sure. (The writer would be very grateful for any Bedfordshire records which readers may have.)

*Apatele alni*, L.—A single fully-grown larva of this species was taken on *Epilobium angustifolium*, L., in King's Wood (19.vii.45). This wood is of mixed growth and the food-plant *Alnus* does occur there. No books on larvae were available and thanks are due to Captain Riley, who kindly identified it, though the writer feels rather ashamed of not identifying so striking an animal himself!

*Myelois cribrella*, Hb.—A single specimen of this moth was taken in July 1941 on the Markham Hills near Barton. These are typical chalk downland.—BERNARD VERDCOURT, 86 Claremont Road, Luton, Beds.

**THE NUMBER OF EGGS LAID BY CERTAIN AGERIIDAE.**—Numbers of eggs were found whilst soaking the abdomens of females of certain species belonging to this family prior to mounting the genitalia. The actual numbers were carefully computed and are listed below. These numbers are, of course, no indication of the maximum, but they are only given for specimens in which the abdomen was completely full of eggs. The specimens were old ones bought for the purpose of preparing genitalia mounts and no localities or, more important in the present instance, dates are available. No reference could be found relating to the subject, but perhaps some enthusiastic breeder can tell how far short of the maximum numbers these figures fall. (The nomenclature of Kloet and Hincks' recent check list is followed, but these names may need revision!) *Sphecia hembeciformis*, Hüb., 366; *Sesia apiformis*, Clerck, 400; *Aegeria scoliaeformis*, Bkh., 260; *A. myopaeformis*, Bkh.,



100; *A. vespiformis*, L., 155; *A. andreniformis*, Iasp., 50; *A. tipuliformis*, Clerck, two ♀♀, one 58, the other 60; *A. philanthiformis*, Iasp., 50; *A. culiciformis*, L., 259.—BERNARD VERDCOURT.

A NOTE ON REARING MACROTHYLACIA RUBI.—After many futile attempts in previous years to rear the "Fox moth," I have this season met with an unexpected success. Last May I found a small batch of ova on one of the neighbouring moors, Totley Moss, and with the usual Spring enthusiasm I decided to try again. The ova duly hatched and the larva were fed through the Summer on apple leaves with occasional bilberry and bramble. They were kept in a cage indoors and they reached full size towards the end of September. I expected they would then as usual die off, but out of twelve larvae which reached full growth five spun cocoons and successfully pupated in early October. Several other larvae spun up but subsequently died. The good pupae were stored in a warm room and the moths emerged between the dates 3rd and 15th November, inclusive.

About half the original ova were given to a friend, Mr Barringer, of Rotherham, who reared the larvae in a cage out of doors. Several of these larvae also spun cocoons in October, but, unfortunately, no moths have materialised.—T. D. FEARNEHOUGH, 25 Ramsey Road, Sheffield, 10.

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### CURRENT NOTES.

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PARTS 2 and 3-4 of *Eos*. (Spain) have just been issued. R. Agenjo describes many species of Agrotidae new to the Spanish Fauna with 3 plates containing 63 figures and 4 plates of structures. Other memoirs are on Coleoptera, Diptera and Hymenoptera of Spain.

THE *Canadian Entomologist* for January has just arrived. Its chief article is a further memoir on the Coleophorids of the Group *Cargae-foliella* with no figures of the imagos, but with plenty of diagrams, meaningless and useless to most entomologists unless they are expert microscopists.

THE *Bol. Ent. Venezolana*, Vol. V, No. 1, March, contains descriptions of a few aberrations of Rhopalocera, *Corades enyo*, *Pedaliodes plotina*, and *Baeotis chironiensis* and an article on the *Sphingidae* of the country. There are two plates of figures.

Pt. 1, Vol. V, of the *Jr. Socy. Brit. Entomology*, 25th June 1946, publishes a Report of the Abundance of *Pontia daplidice* seen or caught during the 1945 season amounting to many hundreds, the majority occurring in the counties near the south coast, only odd examples further inland; Somerset 1, Surrey 4, Middlesex 1, Gloucester 2. There were only a few immigrants of *Lampides boeticus*. This report was matter collected by that indefatigable worker, Capt. T. Dannreuther. A very useful List of Lepidoptera obtained in the Falmouth area of Cornwall,



1843-46, by J. Heath, will be found useful to visitors. Remarks on the more or less undamaged condition of so many of the immigrant *Rhopalocera*, on the Pupation Sites of *Cerura furcula* and on the Ravages of the larvae of *Pieris brassicae* on an allotment in Bournemouth (plate) were made by Lt.-Col. F. C. Fraser. Other articles are by Capt. E. Rivenhall Goffe, two memoirs on *Syrphidae* (Dip.), an Obituary of the late Dr F. H. Haines, and various short general notes.

K. W. VERHOEFF died of wounds received in an air raid on Munich in December 1944. Fortunately, his library and collections have not been damaged. Verhoeff was a lifelong student of the *Diplopoda* and *Chilognatha*, on which he was working to the end. In the early years of the century he produced some remarkable work on the *Dermaptera*, in which he broke new ground. Its value was reduced, however, by obscurity of expression, absence of illustration or any explanation of the new terms he introduced and ignorance of the literature. It was many years before its importance was appreciated, owing to the difficulty in understanding it. He was a keen and energetic worker, with the reputation of "a slashing controversialist." He had no sympathy with modern political events.—M. B.

THE *Canadian Entomologist* for October last gave a curious result of the grasshopper outbreak in Manitoba in 1874-75, when severe and almost irreparable damage was done to the crops. Advances were made by the Administration to all the settlers who would otherwise have been utterly ruined. Foodstuffs and seed grain were imported from the United States. Mortgages were taken with the homesteads as security at 6 per cent. These were gradually paid off but, strange to say, even now, nearly 70 years after, there is still outstanding, in spite of much being written off, \$26,000 not redeemed.

THE Yorkshire Naturalists' Trust Limited has just been formed with the primary purpose of establishing and maintaining sanctuaries for the preservation of wild life, particularly of rare or unusual character. At the first meeting of the Council it was announced that the well-known resort of Naturalists, the wonderfully rich swamp containing Askham Bog, had been given to the Trust. The Trust is desirous of obtaining members who will support the project. The Annual Subscription is 10s. The office of the Trust is the Yorkshire Museum, York. The Hon. Secretary is Bernard Linney, Esq.

WE shall publish in the coming year (1) "The British Genera of the Trypetidae" (Dip.), by J. E. Collin, as a Supplement in two parts, January and February; (2) "A Diary of his Two Months' Holiday last year in the Darjeeling Area of India," by D. G. Sevastopulo; (3) "Notes from letters written me from Togoland, West Africa," by Major T. L. Johnson, who has spent nineteen years in the Gold Coast, Congo, West Central Africa, Cameroons, etc.; (4) Another article on the trackways of Ants by W. Pickles. We conclude the Text of Vol. IV of the British Noctuae Supplement, and proceed with the Appendix to Vols. I, II, III, containing the descriptions of the aberrations described since the Vols. were completed.

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ab. *duebenia*, Strand, *Ent. Zeits.*, XXV (1912), No. 50, 258.

ORIG. DESCRIP.—“The space on both sides of the reniform as well as a streak going to the dorsal margin are very black, there is an oblique black spot at the dorsal margin of the orbicular.” Provence, Düben, Saxony.

ab. *reducta*, nov., from Kloster Neuberz, N. West of Vienna near the marshes at the foot of the hilly ground, is a specimen of a light slate-grey ground with most of the usually strong brown-grey marking reduced in area and with only a slight tinge of brown marking. It seems appropriate to call it *reducta*.

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*Xylina*, Ochs. & Treit. (1816-25), Treit., Steph., Dup., H.-S., Gn., Barr., Stdgr., South, Culot [*Polia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Lithophane*, Hb. (1821), Hamp., Sth., Warr.-Stz., Drdt.-Stz.]: *semibrunnea*, Haw.

Tutt, *Brit. Noct.*, III, 104 (1892): Meyr., *Handbk.*, 51 (1895): Barr., *Lep. Brit. Is.*, VI, 25, plt. 235, 1 (1900): Stdgr., *Cat.*, III ed., 210 (1901): Hamp., *Lep. Phal.*, VI, 244 (1906): Splr., *Schm. Eur.*, I, 258, plt. 47, 5 (1907): South, *M.B.I.*, II, 28, plt. 12, 4 (1908): Warr.-Stz., *Pal. Noct.*, III, 125, plt. 30g (1910): Culot, *N. et G.*, I (2), plt. 56, 6 (1914): Meyr., *Rev. Hand.*, 131 (1928).

Although this species had been distinctly indicated by several authors it was, until Haworth separated it and named it *semibrunnea* in *Lep. Brit.*, 1809, always associated with *petrificata*, Fb., which really had been described by Hufn., etc., in 1766 under the name of *socia*. It was a *socia* with a longitudinal inner marginal dark brown band.

View., *Tab. Verz.*, II, 80, plt. III, 4 (1790), gave a figure with forewing much too broad and much too large but recognizable by marking and colour. It was placed as a form of *petrificata* (*socia*, Hufn.) by all early authors, as well as View.

Steph., *Ill.*, II, 170, plt. 21, f. 3 (1829), gave an excellent figure of Haworth's *semibrunnea*. Wood., f. 221, figures it again.

Hb., *Samml. Noct.*, 242, *petrolignea*.

*l.c.*, 239, *petrificosa*. Both these figures are taken to be minor forms of *petrificata*, Fb. = *socia*, Hufn., which Hampson and others gave as Synonyms.

Dup., *Hist. Nat. Supp.*, III, 373, plt. 34, 4 (1836), gave a good figure of *semibrunnea* under the name *oculata*.

H.-S., *Sys. Bearb.*, II, 303 (1850), gave a figure of *semibrunnea* under the name *oculata*, Germ. I do not recognize the figure H.-S., *oculata*, 460, as *semibrunnea*. It has more or less definite stigmata and other marking, whereas *semibrunnea* (typ.) is more or less half and half light brown costal and dark brown on the inner margin, and practically markingless, in all my specimens. Occasionally the three stigmata are represented by indefinite slight clouds.

H.-S. description agrees with his figure.

Mill., *Icones.*, 7 liv., plt. 33, 1-3 (1862), gave an excellent figure in a life history set of figures.

Gn., *Hist. Nat.*, VI, 121 (1852), treated *oculata*, Germ., and *petrificata*, Dup., as Syns., and referred to H.-S., fig. 460, and Ernst., fig. 371a, b.

Stdgr., *Cat.*, IIIed., 210 (1901), treated *oculata* as a Syn.

Hamp., *Lep. Phal.*, VI, 244 (1906), treated *oculata*, Germ., as a Synonym. He took *petrificosa*, Hb., and *petrolignea*, Hb., as Syns.

Splr., *Schm. Eur.*, I, 258, plt. 47, 5 (1907), gave a good figure.

South, *M.B.I.*, II, 28, plt. 12, 4 (1908), gave an excellent figure.

Warr.-Stz., *Pal. Noct.*, III, 125 (1910), gave *oculata*, Germ., as a Synonym.

Culot, *N. et G.*, I (2), 91, plt. 56, 6 (1904), gave only ab. *brunnea*. His typical figure was very good but rather small.

Barrett's remarks on Variation were:

"Very constant in colour and clouding and in the deficiency of markings."

The Names and Forms to be considered:

*semibrunnea*, Haw., *Lep. Brit.*, 171 (1809).

*oculata*, Germ., *Fn. Insect. Eur.*, IX, plt. 18 (1836), Syn.

Tutt dealt with the typical form as separated out from *petrificata*, the dark inner margined form of *socia* quoting Humphrey and Westwood, "Brit. Moths," at length concerning the former name by which *socia* was designated by some authors.

f. *oculata*, Germar., *Fn. Ins. Eur.*, pt. IX, plt. 18 (1836?).

[I have inserted a query to the published date of Germar as his full description is quoted in Vol. IX of Treit's work dated 1835.]

ORIG. DESCRIP.—"*Oculata* has long narrow wings, which at the apex are no wider than the rest (of the wing). The usual stigmata are quite obsolescent, indicated by pale rings. The colour of the costal area is lighter, that of the inner marginal area darker brown rust colour. Behind the outer margin, near that of the inner margin, lie two stigmata near one another, depicted in light brown, and near them on the inner margin an ovate blackish stigma suffused with brown."

"The hindwings are yellow brown on the outer margin as well as on the darker nervures."

This is nothing but the *semibrunnea*, Haw.

*Xylina*, Ochs. & Tr. (1816-25), Dup., Gn., Stdgr., South, Culot [*Polia*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Graptolitha*, Hb. (1821), Hamps., Sth.: *Lithophane*, Hb. (1821), Warr.-Stz., Drdt.-Stz.], *furcifera*, Hufn., 1766: (*conformis*, Schiff., 1775).

Tutt, *Brit. Noct.*, III, 103 (1892): Meyr., *Handb.*, 52 (1895): Barr., *Lep. Br. Is.*, VI, 32, plt. 235, 3 (1900): Stdgr., *Cat.*, IIIed., 210 (1901): Hamps., *Lep. Phal.*, VI, 261, f. 81 (1906): Splr., *Schm. Eur.*, I, 259, plt. 47, 7 (1907): South, *M.B.I.*, II, 39, plt. 13, 1-2 (1908): Warr.-Stz., *Pal. Noct.*, III, 126, plt. 30i (1910): Culot, *N. et G.*, I (2), 92, plt. 56, f. 9-11 (1914): Meyr., *Rev. Handb.*, 132 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934).



Ernst & Engr., *Pap. d'Eur.*, VI, 105, f. 343a, b (1789), gave two figures with *bifurca*, Esp., for reference. Wernbg., *l.c.*, has identified it.

Schiff., *Verz.*, 76, K. 7 (1775), named a Noctua (Eller-baum Eule) *conformis*, identified as the Noctua named *bifurca*, Esp. by Illiger, *Verz.* (neu herausgeg.) (1801), pt. I, p. 224. Tutt allotted the name *conformis* to Fab. (*Mant.*) who had described it more fully.

Esper, *Abbild. Noct.*, IV, 397, plt. 131, 1 (1789+?), gave a figure of *furcifera*, Hufn., under the name *bifurca*.

View., *Tab. Verz.*, II, 61, plt. III, 1 (1790), gave a very good figure of *conformis*.

Hb., *Samml. Noct.*, 243 (1800-3), gave, under the name of *conformis*, a much lighter form.

Treit., *Schmett. Eur.*, V (3), 12 (1826), gave the Synonyms *conformis*, Hb., Schiff., Illig., Fab.; Bork., de Vill., View., Esp.: *bifurca*, Esp., Lang.: *lateritia*, de Vill.: *angulata*, de Geer.: etc. The species was first described by Hufn., *Berl. Mag.*, III (4), 402 (1766), with the name *furcifera*, which Rott. revised in the *Naturf.*, IX, 134 (1776).

Dup., *Hist. Nat. Noct.*, VII (1), 182, plt. 112, 2 (1827), under the name *conformis*, gave a good figure of a large dark variegated specimen.

In dealing with the *Xylina* species Duponchel treated *conformis*, F. (Schiff.) and *rhizolitha*, F. (Schiff.), as two separate species. The former included the *bifurca*, Esp., and the *furcifera*, Hufn., the latter the *ornithopus*, Hufn. In his descriptions of these he stated that the ground colour of *conformis* was (d'un gris-ardoisé) a slatey-grey, while that of *rhizolitha* was like that of *psi* or of *chi*. In his description of *rhizolitha* he further said (qu'elle offre le même dessin que la *conformis*, mais sur un fond beaucoup plus clair) that it bore the same design of marking as *conformis*, but upon a much lighter ground.

He gave a list of the coinciding details of these markings, and a figure of *rhizolitha* on plate 112, fig. 3. On the same plate he gave a fig. named *conformis* with very dark ground colour in no way of a "slatey-grey." However, Dup. in a further description said "This species had a form of which the forewings are of an almost black colour." This apparently is the figure 2 on the plate 112. Dup. said that this dark insect was the form prevalent in the West of France, Normandy. Doubtless it is the dark *furcifera* found in this country. The figures are excellent ones.

Gn., *Hist. Nat.*, VI, 118 (1852), dealt with this species under the name *conformis*, Schiff. He cited *angulata*, de Geer, *furcifera*, Rott., *bifurca*, Esp., and *candelisequa*, Engr., and described form A. as a deep violet-grey and of a ferruginous grey below.

Butler, *Ann. Mag. N.H.*, (5), I, 142 (1878), described a Japanese form *ustulata*, which has since been dealt with by Warr.-Stz., as a good species, *l.c.*, 126, plt. 31, b (1910).

Meyr., *Handb.*, 51 (1895): *Rev. Handb.*, 128 (1928), used the genera *Polia*.

Stdgr., *Cat*, IIIed., 210 (1901), treated *suffusa*, Tutt, and *ustulata*, Btlr., as forms and *conformis*, Hb., as a Syn.

Hamp., VI, 261, f. 81 (1906), described a new form which Strand subsequently named *debrunneata* in (1915), and recognized the *suffusa*, Tutt. He cited *conformis*, Schiff., and *bifurca*, Esp.

Splr., *Schm. Eur.*, I, 259, plt. 47, 7 (1907), gave a good figure of a typical form: a bluish-green, slightly purple-green mixed. The uniform form is typical. He included the ab. *suffusa*, Tutt, ab. *variegata*, ab. *rufescens*, and ab. *ustulata*, Btlr. He refers to the very strong purple sheen in all forms.

South, *M.B.I.*, II, 29, plt. 13, 1-2 (1908), gave two figures of our British form ab. *suffusa*, Tutt, darker grey with blackish markings. The typical form is said not to occur.

Warr.-Stz., *Pal. Noct.*, III, 126, plt. 30i (1910), gave the figure of a typical form from Central Europe and figures of ab. *variegata* and ab. *rufescens*, and included ab. *suffusa*, Tutt, a violet-black form from the West of England.

Culot, *N. et G.*, I (2), 92, plt. 56, f. 9-11 (1914), gave three quite good figures. Fig. 9 is of a typical form, Fig. 11 is ab. *variegata*, Splr., and has the basal spot and the lines of the forewings very clear, and like other forms is of a violaceous, vinous, or ruddy coloration. Fig. 10 is *suffusa*, Tutt, of a grey blackish-violet.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934), record ab. *debrunneata*, Strnd., ab. *muchslegleri*, Rang., and ab. *obscura*, Lenz.

The Names and Forms to be considered are:

*furcifera*, Hufn. (1766), *Berlin Mag.*, 402.

*conformis*, Schiff. (1775), *Verz.*, 76, K. 7. Syn.

*bifurca*, Esp. (1789+?), *Abbild. Noct.*, IV, 359, plt. 125 B., 6-8. Syni.

ssp. *ustulata*, Btlr. (1878), *Ann. and Mag.*, V, s. I, 162.

ab. *suffusa*, Tutt (1892), *Brit. Noct.*, III, 103.

ab. *rufescens*, Splr. (1907), *Schm. Eur.*, I, 259.

ab. *variegata*, Splr., *l.c.*

ab. *debrunneata*, Strnd. (1915), *Arch. Natg.*, LXXXI, A. 12, 148.

f. *mühlschlegleri*, Rang. (1917), *Deut. Ent. Zeit.*, 129.

ab. *obscura*, Lenz (1927), *Osth. Sudby.*, II (2), 332.

Tutt dealt with the typical continental form as described by Hufn. and Gn., compared the few captured in Britain and described a form of a deep violet-black, or black with a slight violet tinge as ab. *suffusa*.

ssp. *ustulata*, Btlr., *Ann. and Mag.*, V, s. I (1878).

ORIG. DESCRIP.—“Somewhat allied to *A. annexa*: primaries above pale brown, clouded and transversely striated with blackish; a patch at the base of the cell (bordered below by a black line), the reniform and orbicular spots, apex and inner margin of the external border pale silvery brown; secondaries sordid white, the apex and veins brown; a dark brown marginal line; body greyish-brown, anal segments of abdomen laterally tufted with fawn colour; wings below without markings; body below reddish; tarsi above alternately banded with black and white, below reddish banded with black.” Expanse 1 inch 8 lines. Yokohama.

ab. *rufescens*, Splr., *Schmett. Eur.*, I, 259 (1907).

ORIG. DESCRIP.—“The ground colour can be more reddish, but seldom become quite red-brown.”

ab. *variegata*, Splr., *Schmett. Eur.*, I, 259 (1907).

ORIG. DESCRIP.—“A striking form is a purple-brown-grey form with grey-white paled-out costa, inner crossline, the inside central area, and

the spotted waved line, pale, whitish on the inner margin, the whole stigmata and whitish spots of the outer cross lines beyond vein V, the hindwing very pale, especially its fringes."

ab. *debrunneata*, Strand, *Arch. Natg.*, LXXXI, A. 12, 148 (1915).

ORIG. DESCRIP.—"Forewing pale grey with hardly any brown suffusion."

[ab. *debrunneata*] Hamps., *Lep. Phal.*, VI, 261 (1906).

f. *mühlschlegeleri*, Rngnw., *Deutsch. Ent. Zeit.* (1917), p. 129, fig. A.

ORIG. DESCRIP.—"The forewings are of a black-brown ground colour especially around the basal radius and the costal marginal spots, but in somewhat of a duller grade on the inner and outer transverse lines. The waved line and the apical area show well through the violet-grey suffusion. The rusty-yellow spot of the reniform is present. The collar is dark brown without the saddle streak of the typical form, the red-brown around the dark grey spots of the legs, the fringes of the hindwings, the body and the undersides are somewhat redder than in the typical form." From the swamps of Rokitno.

Rangnow records a form uniting the *suffusa*, Tutt, and the *rufescens*, Splr. (Tutt.). Fig. B.

ab. *obscura*, Lenz, *Schmett. Sudbay.*, II (2), p. 332.

ORIG. DESCRIP.—"Dark grey. Up to a grade characteristic for the whole of the area."

*Xylina*, Ochs. & Treit. (1816-26), Dup., Steph., H.-S., Gn., Barr., Stdgr., Sth., Culot [*Polia*, Ochs. & Treit. (1816-25), Meyr., 1st: Meyr., 2nd: *Lithophane*, Hb. (1821), Sth., Warr.-Stz., Drdt.-Stz.] *socia*, Rott. = Hufn.

Tutt, *Brit. Noct.*, III, 105 (1892): Meyr., *Handb.*, 51 (1895): Barr., *Lep. Br. Is.*, VI, 28, plt. 235, 2 (1900): Stdgr., *Cat.*, IIIed., 210 (1901): Hamp., *Lep. Phal.*, VI, 245 (1906): Splr., *Schm. Eur.*, I, 258, plt. 47, 6 (1907): South, *M.B.I.*, II, 29, plt. 12, 5 (1908): Warr.-Stz., *Pal. Noct.*, III, 125, plt. 30g (1910): Culot, *N. et G.*, I (2), 92, plt. 56, 7 (1914): Meyr., *Rev. Handb.*, 131 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934).

Esper., *Abbild. Noct.*, IV (2), 1, 413, plt. CXXXIII, f. 6 (1789?+), gave an umber brown figure rather small for *socia*; under the name *umbrosa*. Werneb. diagnosed it as *socia* (*petrificata*), who said "only recognizable with the help of the figure"; the description was defective.

Ernst. & Engr., *Pap. d'Eur.*, VI, 152, f. 371a, c (1799), gave two figures determined by Werneb. as this species. One was a reddish-grey form with sparse suppressed marking (*socia*), the other was a blackish-brown form with more marking expressed (*petrificata*).

Treit., *Schm. Noct.*, V (3), 23 (1826), under the name *petrificata* gave an account of *socia* and included Esper.'s *umbrosa*.

Dup., *Hist. Nat.*, VII, 213, plt. 113, f. 7 (1827), under the name *petrificata* gave a dark figure of *socia* with a reddish-grey ground streaked with brown. As syns. he gave *petrificosa*, Hb., *umbrosa*, Esp., and *socia*, Hufn.



Steph., *Ill.*, II, 171, plt. 23, 1 (1829), gave Schiff. as the authority. The ground colour was "pale ochreous or griseous-brown with darker clouds, stigmata pale ochreous, middle of inner margin and at base of a deeper brown." The figure is rather dark with a semifascia of black-brown between the two stigmata from the costa to the disc bending around below the orbicular. Wood, f. 222.

H.-S., *Sys. Bearb.*, II, 303 (1850), said that Hb. 239 *petrificosa* was good, and often much darker. It was the *umbrosa*, Esp.

Gn., *Hist. Nat.*, VI, 121 (1852), under the *petrificata*, Schiff., cited Hb. 239; Ernst & Engr., fig. 371c; Steph., II, 171, plt. 23, 1; View., No. 128, plt. 3, f. 4. Var. A is *pallida*, Tutt.

Stdgr., *Cat.*, IIIed., 209 (1901), treated *petrificata* as a Syn.

Hamp., *Lep. Phal.*, VI, 245, fig. 80 (1906), put *petrificata*, *petrificosa* and *petroliginea* as synonyms. A fairly good b. and w. fig.

Splr., *Schm. Eur.*, I, 258, plt. 47, 6 (1907), included three forms, ab. *pallida*, Tutt.; ab. *rufescens*, Tutt.; and ab. *petrificata*, Fb., a form greyer between the stigmata and on the inner margin more strongly darkened and darker blackish-brown hindwings.

South, *M.B.I.*, II, 29, plt. 12, 5 (1908), gave an excellent figure without the dark shade on inner margin.

Warr.-Stz., *Pal. Noct.*, III, 125 (1910), gave *petrificata*, Fb., *petrificosa*, Hb., as syns. They gave three forms, ab. *umbrosa*, Esp., fig. 30g, ab. *pallida*, Tutt., "an extremely pale *umbra*," and *rufescens*, Tutt., in which the ochreous is suffused with rosy. They gave a figure of the type form.

Culot, *N. et G.*, I (2), 92, plt. 56, 7 (1914), gave *petrificata* as a syn. and recognized the *pallida*, Tutt. He gave an excellent figure of the typical form and of ab. *pallida*, also.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934), gave an additional form, ab. *nigricans*, Klem., "much darker with blackish forewings."

#### The Variation according to C. G. Barrett:

"Not very variable, but in western districts, and especially in S. Wales, the dorsal half of the forewings in some specimens or even the whole surface, is more than usually clouded with rusty-red mixed with black, and the usual small central cloud is increased in size and blackened, sometimes spreading into a broad ill-defined leaden-black patch over the dorsal margin. In such examples the pale clouds representing the stigmata are rather more distinct. A much more red form has been taken at Enniskillen, Ireland, by Colonel Partridge. But the most remarkable aberration known to me is in the collection of Mr Sydney Webb; in it the surface of the fore and hindwings is dappled over with brownish-white, partially in rings, as though the usual colour had been semifluid, and had been rained upon."

#### The Forms and Names to be considered:

*socia*, Rott. (1766), *Naturf.*, IX, 142.

*petrificata*, Fab. (1787), *Mant.*, 182.

ab. *umbrosa*, Esp. (1789+?), *Abbild. Noct.*, IV (2), 1, 413, plt.

CXXXIII, f. 6.

*petrofusa*, Hb. (1803), *Saml. Noct.*, 239. Syn.

*petroliginea*, Hb. (1821), *Verz.*, p. 245, Nondescrip. Syn.

ab. *pallida*, Tutt (1892), *Brit. Noct.*, III, 107.

ab. *rufescens*, Tutt, *l.c.*

ab. *puncta-rufescens*, Tutt, *l.c.*

ab. *suffusa-rufescens*, Tutt, *l.c.*

ab. *nigricans*, Klem. (1912), *Sprau. Kom. Krak.*, XLVI, 14.

13 820

Tutt dealt with: I. the typical *socia*, brownish ochreous, with darker longitudinal striations. II. ab. *pallida*, pale yellow-ochreous, markings obsolete. III. *umbrosa*, pale yellow-ochreous with dark central shade (under reniform). IV. *petrificata*, pale yellow-ochreous with dark inner margin. V. *rufescens*, reddish-ochreous (sometimes strongly red) markings obsolete. VI. *puncta-rufescens*, reddish-ochreous, with dark shade under reniform. VII. *suffusa-rufescens*, reddish-ochreous, with dark inner margin.

Mr C. N. Hawkins has pointed out that the ♂ is dimorphic; typical ♂ is brown; ab. *pallida* ♂ is pale yellow-ochreous.

ab. *nigricans*, Klem., *Sprau. Kom. Krak.*, XLVI, 14 (1912).

ORIG. DESCRIP.—“ Multo obscurior, alis anterior, nigrescentibus.”

*Calocampa*, Steph. (1829), Steph., Gn., Stdgr., Splr., South, Culot [*Polia*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Xylina*, Ochs. & Treit. (1816-25), Dup., H.-S., Hamp., Warr.-Stz., Drdt.-Stz.] *vetusta*, Hb., *Noct.* 459 (1809).

Tutt, *Brit. Noct.*, III, 107 (1892): Meyr., *Handb.*, 50 (1895): *Lep. Brit. Is.*, VI, 58, plt. 237, 2 (1900): Stdgr., *Cat.*, IIIed., 211 (1901), 2180: Hamp., *Lep. Phal.*, VI, 281 (1906), fig. 82: Splr., *Schm. Eur.*, I, 261, plt. 47, 13 (1907): South, *M.B.I.*, II, 35, plt. 14, 1-2 (1908): Warr.-Stz., *Pal. Noct.*, III, 127, plt. 31c (1910): Culot, *N. et G.*, I (2), 95, plt. 57, 2 (1914): Meyr., *Rev. Hand.*, 131 (1928).

Ernst & Engr., *Pap. d'Eur.*, VI, 149, f. 370d, e (1790), gave a good figure of *vetusta*, which was called an ab. of *exoleta* by Werneb.

Treit., *Schm. Noct.*, V (3), 2 (1826), cited only four authors' works. Rösel, Ernst & Engr., and Hb., 459.

Dup., *Hist. Nat.*, VII, 159, plt. 111, f. 1 (1827), gave a good figure of *vetusta*, which he distinguished from *exoleta*, in *vetusta* having the upper part light, and in *exoleta* dark in tint. Hindwings a uniform yellowish-grey.

Steph., *Ill.*, II, 174 (1829), stated that Donovan figured *vetusta* under the name (Wood f. 224) *exoleta*, hence he was “ the first English writer who furnishes us with a knowledge of the insect in question.”

H.-S., *Sys. Bearb.*, II, 303 (1850), said that Hb. 459 was recognizable.

Gn., *Hist. Nat.*, VI, 115 (1852), referred to Hb. 459; to Ernst & Engr. figs. 370b, d, e; and a Scotch form as var. A. “ intense black (brûlé), as fringes and thorax, the rest more obscure grey than in the type form.” He noted that Don's *exoleta*, plt. 187, is a “ pale *vetusta*.”



Stdgr., *Cat.*, IIIed., 210 (1901), gave the American *nupera* as an ab. "al. ant. saturatius brunneis linea basali strigaeque media nigris distinctioribus."

Hamp., *Lep. Phal.*, VI, 281, f. 82 (1906), a good b. and w. fig.

Splr., *Schm. Eur.*, I, 261, plt. 47, 13 (1907), gave three forms: ab. *brunnea*, Tutt; ab. *albida*, Petersen, and an American ab. *nupera*, Lintner.

South, *M.B.I.*, II, 35, plt. 14, 1 and 2 (♂ and ♀) (1908), gave two excellent figures.

Warr.-Stz., *Pal. Noct.*, III, 127 (1910), gave a typical figure (31c), gave two forms with figures: ab. *albida*, Splr. (31c), diffuse streak of white scales along the disc, and ab. *brunnea*, Tutt (31c), brighter ochreous, black-brown shading.

Culot, *N. et G.*, I (2), 95, plt. 57, 2 (1914), gave a close comparison with *exoleta*. He recognized only ab. *nupera*, Lint. His fig. was an excellent one.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934), gave another form, ab. *dufayi*, G. d'Ald., an unusually dark ab.; may be a hybrid with *exoleta*, L.

Of the Variation Barre t said:

Variable in the depth of the red-black clouding on the dorsal region of the forewings, this in some specimens from northern and western districts being intensified nearly to deep black, while in other Scottish examples it is generally obliterated, leaving almost the whole wing red-dish drab. In two specimens taken near Haslemere, Surrey, where the species is very rare, there is a somewhat similar tendency, but the general colour is paler, more smoky, and not of so clear a red-drab. Occasionally specimens are so smoky, or tinged with grey, as closely to resemble *C. exoleta*, though even then readily distinguished by the long black streak outside the reniform stigma. Usually in these paler examples the black blotch or streak under the orbicular is smaller, sometimes only an ovate spot, while in the darkest examples it attains the greatest development.

The Forms and Names to be considered:

*vetusta*, Hb. (1809), *Saml. Noct.*, 459.

[ssp. *nupera*, Lint. (1874), *Bull. Buff. Soc.*, 188. Amer.]

ab. *brunnea*, Tutt (1892), *Brit. Noct.*, III, 107.

ab. *suffusa*, Tutt, *l.c.*, 108.

ab. *albida*, Splr. (1907), *Schm. Eur.*, I, 261, plt. 47, 13.

ab. *dufayi*, Gos. d'Ald. (1915), *Bull. Soc. ent. Fr.*, 80.

Tutt dealt with (1) the pale ochreous-brown with the inner margin of a darker brown; (2) *brunnea*, the Irish (some Scotch), with almost total absence of the ashy-grey shade along the median shade; (3) ab. *suffusa*, lower wings two-thirds of a deep fuscous black as well as the fringe and the thorax.

[ab.] *nupera*, Lintner, *Bull. Buff. Soc.*, II, 188 (1874).

ORIG. DESCRIP.—Stdgr., *Cat.*, IIIed., 211, "al. ant. saturatius brunneis, linea basali strigaeque media nigris distinctioribus." Hamp., *l.c.*, VI, 281, gave *nupera* as a sp. Smith, *Cat. Amer. Noct.*, 235 (1893), treated it as a sp. Canada and N. American States, plt. ciii, 10.



ab. *albida*, Splr., *Schm. Eur.*, I, 261 (1907).

ORIG. DESCIP.—“The whitish longitudinal shade can be very much developed, even the whitish suffusion at the apex, rarely in Germany, often in Estland at the apex (Petersen); according to Bartel as a variety of the South Ural.”

ab. *dufayi*, Gos. d'Ald., *Bull. Soc. ent. Fr.*, 80 (1915).

ORIG. DESCIP.—“At first sight one may take it for *C. exoleta* of which it has the coloration, without regard to the collar and the pterygodes; but the forewings are of two very distinct shades, the upper longitudinal third is of the colour of the lower third of the wing of *exoleta*, the two lower thirds are black below the area of the sagittate character. This sagittate marking is unique, the orbicular is very obscure.” Chantilly. The author suggests a hybrid of the two *Calocampas*.

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*Calocampa*, Steph. (1829), Gn., Stdgr., Splr., Sth., Culot [*Polia*, Ochs. & Tr. (1816-25), Meyr., Meyr.; *Xylina*, Ochs. & Treit. (1816-25), Dup., H.-S., Hamp., Warr.-Stz., Culot, Drdt.-Stz.] *exoleta*, L. (1758).

Tutt, *Brit. Noct.*, III, 108 (1892): Meyr., *Handb.*, 50 (1895): Barr., *Lep. Brit. Is.*, VI, 54, plt. 237, 1 (1900): Stdgr., *Cat.*, IIIed., 211 (1901): Hamp., *Lep. Phal.*, VI, 285 (1906): Splr., *Schm. Eur.*, I, 261, plt. 47, 14 (1907): South, *M.B.I.*, 234, plt. 14, 3-4 (1908): Culot, *N. et G.*, I (2), 96, plt. 57, 3 (1915): Warr.-Stz., *Pal. Noct.*, III, 127, plt. 31d (1910): Meyr., *Rev. Handb.*, 130 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934).

Many authors and writers have dropped the *s* and have given the name as “*exoleta*.” Stdgr. is wrong in quoting *exoleta*, L. Linn., *ex)soleo*, *solitum* = ?? Stdgr., *ex)oletum* = the stinking thing, filth, excrement. [Its name refers to its resemblance to a piece of rotten wood.—T.B.F.]

Esper, *Abbild. Noct.*, IV (2), 1, p. 433, plt. cxxxviii, f. 1 (1790+?), gave a rather dark figure of *exsoleta*, somewhat too dark. Teste Wernebg.

Ernst & Engram, *Pap. d'Eur.*, VI (1790), 149, f. 370, ab., gave a very good figure of *exsoleta*.

Bork., *Naturg. Noct.*, IV (1792), 319 and 326, gave descriptions of *Xy. exsoleta* and *Xy. petrificata (socia)*.

Treit., *Schm. Noct.*, V (3), 7 (1826), under the spelling *exoleta*, L., gave a list of 28 authorities he cited, but he cited everyone as spelling the name without the *s* which is not correct. Linné put the *s* in (1758).

Dup., *Hist. Nat.*, VII, 163, plt. 111, fig. 2-4 (1827), gave a good figure of *exsoleta*, with the hindwings very uniform deep brown.

Steph., *Ill.*, II, 172 (1829), cited Curtis, VI, 256. This was preceded by a dissertation on the purpose and use of genera in defence of his erection of the genus *Calocampa* for the two species *exsoleta* and *vetusta*, as distinct from *Xylophasia* and *Xylina*. (He pointed out Donovan's error in his fig., see *vetusta*). Wood, f. 226.

H.-S., *Sys. Bearb.*, II, 302 (1850), said that Hb. 244 was not sharply marked enough.

Gn., *Hist. Nat.*, VI, 116 (1852), referred to Ernst & Engr., 370a, c, f, g, h; Curtis, fig. 256; Don. 187; Hb. 244; Esp. 138; said differed from *vetusta* as larger, more burnt-grey, inner margin and abdomen, concolorous; the subterminal has only two teeth tipped with black, but does not touch the reniform, etc. [Don. 187 is *vetusta*.]

Stdgr., *Cat.*, III, 211 (1901), treated *impudica* as an ab. "dilutior, al. ant. minus signatis, magis cinereis."

Hamp., *Lep. Phal.*, VI, 285 (1906), treated *impudica* as an ab., from Turkestan. "Paler, f.-w. greyer and less distinctly marked."

Splr., *Schm. Eur.*, I, 261, plt. 47, 14 (1907), gave two forms, ab. *obscurata* and *impudica*, Stdgr.

South, *M.B.I.*, II, 34, plt. 14, figs. 3 and 4 (♂ and ♀) (1908), gave two excellent figures.

Warr.-Stz., *Pal. Noct.*, III, 127 (1910), gave a fig. of the typical form (31d) and gave three forms, ab. *impudica*, Stdgr., Cent. Asia, paler and more ashy-grey; ab. *obscurata*, Splr., whole forewing suffused brown; and ab. *pallescens*, Warr. (31d), all the black-grey shading absent.

Culot, *N. et G.*, I (2), 96, plt. 57, 3 (1915), gave a close comparison with *exsoleta*. He recognised only ab. *nupera*, Lint. His fig. is an excellent one.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 137 (1934), gave a fig. of *impudica* (17g).

#### Of the Variation Barrett said:

Hardly variable except in the darkness and extent of the central smoky-black clouding, and of the black edging of the reniform stigma, as already indicated, but in Dr Mason's collection is a specimen having the forewings wholly suffused with smoky-black.

#### The Forms and Names to be considered:

*exsoleta*, L., *Syst. Nat.*, Xed., 518 (1758).

ssp. *impudica*, Stdgr., *Stett. e. Zeitg.*, XLVIII, 35 (1888).

ab. *obscurata*, Splr., *Schm. Eur.*, I, 261 (1907).

ab. *pallescens*, Warr.-Stz., *Pal. Noct.*, III, 127 (1910).

Tutt dealt with (1) the typical *exsoleta* and (2) *B.N.*, IV, 127, the ssp. *impudica*, Stdgr., "lighter in coloration and less pronounced in markings. F.w. ashy-grey without a brown tint mostly with strikingly lighter yellow-grey outer margin. All darker marking more suffused. It was also lighter."

race *impudica*, Stdgr., *Stett. e. Zeit.*, XLVIII, 35 (1888).

ORIG. DESCRIP.—"In 1882 I obtained three specimens from Lepsa and Saisan. Since then I have obtained them in large numbers from Margelan and Samarkand, where they were found in late autumn or hibernated in March. This form has the peculiarity of being lighter coloured than all the other central Asian forms and somewhat less marked than is the same European species. The forewings are ashy-grey, without brownish tinge, mostly with conspicuous, light, yellow-grey exterior portions (or outer spots). All the darker markings tend to be obsolescent. The hindwings are also lighter, with paler, almost white fringes. Naturally also the underside of var. *impudica* corresponding



to this is lighter. The hindwings are almost whitish with darkly powdered veins. The black middle spot is also always present, but the dark transverse line is in this sometimes wholly wanting."

Hamp., *Cat. Lep. Ph.*, VI, 286 (1906). Paler; the forewing greyer and less distinctly marked.—W. & E. Turkestan.

ab. *obscurata*, Splr., *Schm. Eur.*, I, 261 (1907).

ORIG. DESCRIP.—"Rarely are examples darkened wholly brown."  
*obscurata*.

ab. *pallescent*, Warr.-Stz., *Pal. Noct.*, III, 127, plt. 31d (1910).

ORIG. DESCRIP.—"In which all the black-grey shading is absent and the whole forewing, except narrowly along the costa, is pearly-grey."  
"In this the markings are as distinct as in the type form and the hindwing is quite pale fuscous."

*Lithonia*, Curtis (1838), South [*Polia*, Ochs. & Treit. (1816-25), Meyr., Meyr.; *Xylina*, Ochs. & Treit. (1816-25), Steph., Dup., H.-S.: *Calocampa*, Steph. (1829), Stdgr., Splr., Culot: *Cloantha*, Curtis (1839), Gn., Warr.-Stz., Hamp.] *solidagin*, Hb. (1821).

Tutt, *Brit. Noct.*, III, 108 (1892): Meyr., *Handb.*, 51 (1895): Barrett, *Lep. Br. Is.*, VI, 46, plt. 236, 3 (1900): Hamp., *Lep. Phal.*, VI, 239 (1906): Splr., *Schm. Eur.*, I, 262, plt. 47, 16 (1907): South, *M.B.I.*, II, 32, plt. 12, 8 (1908): Warr.-Stz., *Pal. Noct.*, III, 124, plt. 30e (1910): Culot, *N. et G.*, I (2), 96, plt. 57, 4 (1915): Meyr., *Rev. Handb.*, 131 (1928).

Treit., *Schm. Noct.*, V (3), 11 (1826), cited only Hüb. 256 for his note on the species.

Dup., *Hist. Nat.*, VII, 179, plt. 112, 1 (1827), gave a very fair fig. of a typical form, much too formal with too much contrast between ground and marking.

Steph., *Ill.*, IV, 390 (1834): *l.c.*, III, 87 (1829), "*thapsiphaga*" ? c.f. [Wood, plt. 16, f. 389 (1834), Wood, p. 240, f. 1667 (1838)], etc.

H.-S., *Sys. Bearb.*, II, 302 (1850), said that Hb. 256, was too bad, in fact useless. The forewing was too wide behind, too variegated, hindwing too yellow, much too sharply marked.

Gn., *Hist. Noct.*, VI, 115 (1852), referred to Curtis, fig. 683.

Freyer, *Neu. Beitr.*, VII, plt. 634 (1858).

Stdgr., *Cat.*, IIed., 120 (1871), described a dark unicolorous ashy-grey form from N. Germany and named it *cinerascens*.

Meyr., *Hand.*, 51 (1895), used the genus *Polia* and also in the *Rev. Handb.*, 131 (1928).

Stdgr., *Cat.*, III, 211 (1901), took *germana*, Morr., as an American ab. and dealt with ab. *cinerascens*, Stdgr., and ab. *pallida*, Tutt, as forms. "*pallidior*, al. ant. minus signatis cinerascensibus."

Hamps., *Lep. Phal.*, VI, 17, plt. xcvi, 23 (1906).

Splr., *Schm. Eur.*, I, 262, plt. 47, 15 (1907), gave two forms, *virgata*, Tutt, and *suffusa*, Tutt, and said that the fig. of Hb. was very strongly marked with brown. He also included *cinerascens*, Stdgr.



South, *M.B.I.*, II, 32, plt. 12, figs. 8-9 (1908), f. 8 is probably a typical form with discal area brown while f. 9 the central area is blackish-brown and the form *ab. variegata*, Tutt. The figures are very good.

Warr.-Stz., *Pal. Noct.*, III, 124 (1910), gave three forms and a figure (30e) a typical form, and one of *ab. cinerascens*, Stdgr. (30e); *ab. obscura*, Lutz., dark suffused, and *ab. pallida*, Tutt, a very pale form from Cannock Chase.

Culot, *N. et G.*, I (2), 96, plt. 57, 4 (1914), recognized *ab. obscura* and *ab. suffusa*. He gave a good figure but not quite our British form.

#### Barrett's description of the Variation:

Variations seems to be in some degree local; specimens from S. Yorkshire often have the middle portion of the forewings much blackened; many of those from Cannock Chase, S. Staffs., have the margins, the costa especially, shaded with brown, while in those from N. Staffs. the hinder half of the wings is much whitened. Fine examples of these forms have been furnished by Mr F. C. Woodforde. Among others sent by Mr A. Horne from Aberdeen, are some having a broad smooth paler band across the middle of the wing and the basal region darkened; others in which the central area is prettily rippled with dark grey, and the first and second lines are very distinct and faintly duplicated. In the collection of Mr S. J. Capper is a specimen having a broad pale transverse band filling the space from the first line to the central shade; another has a very narrow black central stripe. The presence in many specimens of a second orbicular stigma in the discal cell is very curious and unusual.

#### The Forms and Names to be considered:

*solidaginis*, Hb., *Saml. Noct.*, 256 (1821).

*ab. cinerascens*, Stdgr., *Cat.*, IIed., 120 (1871).

race *germana*, Morr., *Bull. Buff. Soc.*, II, 192 (1874). Amer.

*ab. pallida*, Tutt, *Brit. Noct.*, III, 110 (1892).

*ab. virgata*, Tutt, *l.c.*

*ab. suffusa*, Tutt, *l.c.*

*ab. obscura*, Lutzau, *Ent. Zeit.*, XIV, 155 (1901).

ssp. *albertae*, (Hamp.), *Lep. Phal.*, VI, 240 (1906); Strand., *Arch. Nat.*, LXXXI, A. 11, 147 (1915).

*ab. rangnowi*, Stich., *Berlin Ent. Zt.*, LIII, 103, f. 10 (1908).

Tutt dealt with (1) pale ashy-grey, central shade almost obsolete, *ab. pallida*; (2) the typical form *solidaginis*, ashy-grey with brown central shade; (3) *ab. virgata*, ashy-grey with dark blackish central shade; (4) *ab. suffusa*, ashy-grey, blackish from base to central shade; (5) *ab. cinerascens*, dark unicolorous ashy-grey.

race *germana*, Morris., *Bull. Buff. Soc. N. Sci.*, II, 192 (1874).

ORIG. DESCRIP.—“Habit and markings of *solidaginis*, but differing in the following respects. Base of the antennae concolorous instead of white. Legs, breast and collar coloured with brown. Costa on the median and subterminal spaces distinctly tinged with brown. The orbicular spot geminate, consisting of two equal, concolorous white wings. The reniform very distinct, rounded, outwardly excavated with a central white curved spot, surrounded by a dark shade—the whole enclosed

within a clear fine white annulus. The median lines are nearly obsolete. The exterior line only evident opposite to the reniform; there it forms long acute teeth on the nervules. The median shade consolidated into one broad, black, even, outwardly curved band, and not diffused throughout the median space as in *solidaginis*. Subterminal line and the two preceding dashes as in the allied species. Posterior wings uniform, dark fuscous, without median line; beneath whitish, also without line, but with a strong discal dot. Adirondack Mts."

"Strongest distinctive characters are shape of the reniform, and different shapes and importance of the median lines." U.S.A.

ab. *obscura*, v. Lutzau, *Ent. Zeits.*, XIV, 155 (1901).

ORIG. DESCRIP.—"The base and central area wholly black, only on the costal margin dark grey and only here is the front transverse line slightly indicated, otherwise markingless. The reniform stigma defined clearly in white, with a curved white discal mark; the marginal area grey-white, with the narrow black nervures running through; the waved line white with a large W marking and black arrow spots; fringes dark grey. Hindwings pale grey, on the border dark grey, with black discal curve; marginal line darker, fringes white. On the underside of the hindwing is a dark zig-zag curved line. Thorax dark grey; abdomen brown-grey." Bathen-Curland.

race (*albertae*), Hamp., *Cat. Lep. Ph.*, VI, 240 (1906).

ORIG. DESCRIP.—"Head, thorax, and forewings much deeper blue-grey tinged with fuscous instead of brown; hindwing mostly suffused with fuscous." Alberta.

Named in (1915) by Strand, not by Hampson. (*Arch. Nat.*, LXXXI, A. 11, 147.)

f. *rangnowi*, Stich., *Berl. ent. Zt.*, LIII, 103 (1908).

FIG.—Plt. iii, fig. 10.

ORIG. DESCRIP.—"Forewing deep black, only in a few places particularly on the zig-zag line, which in the typical form is really completely suffused grey. Reniform whitish, black centred, confined by a whitish ring; the submarginal, a W marking forming the waved line also whitish and standing out clearly from the black ground. Hindwing light brown-grey in the basal area, darkened similarly on the distal margin, with the marginal line blacker and the fringes whitish. Thorax grey, abdomen brown-grey. Underside: forewings strongly darkened, hindwings with slightly grey-black suffusion, with distinct black spots in the basal area and a narrow grey-brown, insignificant discal band."

### CUCULLIA, Schrnk.

The extraordinary similarity of the majority of the species collected together in this genus, is commented on by all authors. Tutt quoted the admirable summary of Guenée who wrote, "By a strange law of nature, they are as uniform and as wanting in brilliancy as they are beautiful and variable. This absence of Colour and Marking, makes the species very similar to one another, while the larvae are most dissimilar. . . . One of the most remarkable characters about these species



is the development of a collar, from which their generic name has arisen. The insect is able at will to decrease and augment its size, depressing or raising the lobes by the contraction or expansion of the membrane on which the lobes are placed. Hence the specimens in our collections have this character depressed or expanded, according as the insect has died. But still it is often a reliable character for identification."

The figures of most of the species are more or less impossible to depict accurately. It is almost impossible to give the ground colour unless by hand colouring, and then this must be done by an artist, such as the old miniature painters were.

The following are the species to which South referred (*M.B.I.*, II, 36, etc. (1908), Main Ed.). Some species are found regularly in Britain, while others are reported as having occurred very occasionally.

*C. verbasci*, L., *l.c.*, 36, plt. 15, f. 1, ♂, 2, ♀; plt. 18.

*C. scrophulariae*, Cap., very doubtful if indigenous, *l.c.*, 37, plt. 15, f. 3?

*C. lychnitis*, Rmb., *l.c.*, 38, plt. 15, f. 4, 5; plt. 18, 2.

*C. asteris*, Schiff., *l.c.*, 39, plt. 15, f. 6, 2; plt. 18, 3.

*C. umbratica*, L., *l.c.*, 40, plt. 16, 5, ♂, 6, ♀.

*C. chamomillae*, Schiff., *l.c.*, 40, plt. 16, 1 (typ.), 2, ab. *chrysanthemi*; plt. 18, f. 1.

*C. gnaphalii*, Hb., extremely rare, *l.c.*, 41, plt. 13, f. 4, 5.

*C. artemisiae*, Hfn. (*abrotani*, F.), no absolute proof of presence, *l.c.*, 43, plt. 16, 3.

*C. absinthii*, L., *l.c.*, 42, plt. 16, f. 4.

Splr., *Schm. Eur.*, I, 267-276 (1907), treated 46 European species, describing and figuring them with criticism of the figures on his plates. The figures were largely those which had been used in the two original editions by Dr Ernst Hoffmann.

*C. verbasci*, L., plt. 48, fig. 7 (forewing too dark).

*C. scrophulariae*, Cap., plt. 48, 8 (wholly faulty).

*C. lychnitis*, Rmbr. (emend.), plt. 48, 9 (wholly faulty).

*C. asteris*, Schiff., plt. 48, 13 (hindwing too brown).

*C. umbratica*, L., plt. 48, 18 (faulty).

*C. chamomillae*, Schiff., 48, 23 (wholly faulty).

*C. gnaphalii*, Hb., plt. 49, very good figure.

*C. absinthii*, L., plt. 49, 8, a good figure.

Splr., *scrophulariae* compared with *verbasci*.

"Somewhat narrow-winged, with duller, and paler toned forewings, on which the costal streak is distinctly greyer than on the hind margin. The paler part before this is hardly apparent."

Warr.-Stz., *Pal. Noct.*, IV, 102-110 (1910), gave short descriptions of all the *Pal. Cucullia*, some 70 species. Figures of the species we are interested in are as follows:—

*C. verbasci*, 27g, h, ♂, ♀. Sth. figs., plt. 15, 1-2.

*C. scrophulariae*, 27h, ♂, ♀. Sth. fig., plt. 15, 3.

*C. lychnitis*, 27g, ♂, ♀. Sth. figs., plt. 15, 4-5.

*C. asteris*, 27c, ♂, ♀. Sth. fig., plt. 15, 6.



*C. gnaphalii*, 27c, ♂. Sth. figs., plt. 13, 4-5.

*C. chamomillae*, 26g (*fusina*, Haw., *lucifuga*, Dup.), ♂. Sth. figs., plt. 16, 1-2.

*C. umbratica*, 26f (*lucifuga*, Esp., *lactucae*, Hb., *tanacetii*, Steph.), ♂, ♀. Sth. figs., plt. 16, 5-6.

*C. absinthii*, 26f (*punctigera*, Hfn.), ♂. Sth. fig., plt. 16, 4.

*C. artemisiae*, Hufn., 26c (*abrotani*, F.), ♂. Sth. fig., plt. 16, 3.

H.-S. wrote (II, 306-308) a deal about the *Cucullia* species, but seemed to be uncertain about some of the species. Especially did he confuse *verbasci*, *scrophulariae*, *lychnitis*, *thapsiphaga*, and *blattariae*. In fact in his text he ascribed the figure (204) named *lychnitis* on the plate to *thapsiphaga* (p. 313). His notes on Hb.'s figures are indicative of his identifications.

Hb. 266, *verbasci*, "was good," p. 313.

Hb. 267, *scrophulariae*, "was good," p. 313.

Hb. 260, *asteris*, "very badly drawn." 560 forewing too wide outwardly, hindwing much too light and yellow," p. 311.

Hb. 261, *chamomillae*, "I have never seen it so blue-grey. 686-7, *chrysanthemi*, "far too brown, the two spots between the stigmata too dark," p. 315.

Hb. 263, *umbratica*, "somewhat too dark; the markings in many examples are stronger," p. 317.

Hb. 259, *artemisiae*, "good," p. 318 [he treated *abrotani* as a good species, p. 309].

Hb. 258, *absinthii*, "too variegated; hindwings too white," p. 310.

Hb. 582-3, *gnaphalii*, "shape bad; the forewing with too much expanded vertical border, that of the female with costa too convex," p. 309.

#### CUCULLIA VERBASCI, L.

*Cucullia verbasci* is perhaps the most common of our British "sharks," with its beautiful brilliant larva feeding on Mullein.

Tutt said of this species, "There is more yellow-brown in the ground colour of most of our British specimens than in those of the allies. Some are almost uniformly brownish with no very great difference between the ordinarily paler central area of the wing and the darker costal and inner marginal areas. Sometimes these dark parts have a tendency to blackish, and when in addition the dark inner marginal is edged on its outer half with whitish it throws it up very distinctly." Tutt named no aberration of the species.

Of the Variation Barrett said:

Not variable, except in a slight degree in the depth of ground colour of the dark stripes.

#### CUCULLIA SCROPHULARIAE, Capieux.

This species does not seem to have been actually identified in this country. Collectors for many years called the "sharks" bred from larvae feeding on *Scrophularia aquatica*, as *Scrophulariae*; but as *ver-*

*basci* larvae also feed on this plant, and the larvae seems never to have been differentiated here, the species still remains unidentified. I have a number of so-called *scrophulariae* from different localities from the Continent and I cannot see any differentiation from *verbasci*.

Some entomologists have considered this species as resembling *lychnitis* more than it does *verbasci*. Tutt noted that the main distinction is to be based on its time of emergence following the experiences of Guenée, who reported that *lychnitis* emerges in June and July, whereas *scrophulariae* comes out in April and May or even in March.

There is little to be added to Tutt's short account of this practically unvariable species except that the female is of a somewhat duller brown.

As to British *scrophulariae* there seems to be so little evidence of whether it represents an actual specific form or not, that all one can do is to doubt its existence. The result of the discussion recently published got us no further. For a long time facts, if they be really reliable as facts, were brought forward to support it. One was that it was attached to the plant *Scrophularia nodosa*, and the other that its period of development was later than that of *C. verbasci*. These facts ?, however, are so discounted by undoubted *verbasci* larvae feeding equally on *S. nodosa* as on *V. thapsus* and by the stated periods of the life-history overlapping, are not sufficiently so to support the assertion. Nor has the larva been differentiated in support of a separate species in Great Britain.

Culot, *N. et G.*, I (2), p. 109 (1913), endeavoured to differentiate the two species by very minute shades of marking but the colour and marking of so many of the species in the genus *Cucullia* are so simple that they do not seem convincing as the sum total of them are not supported by biological facts.

He said that "the ground colour of the forewings was a brownish-ochraceous occasionally a little violaceous in *verbasci*, while it is yellower and clearer in *scrophulariae*. In *verbasci* the *costa* is of a dull reddish-brown; in *scrophulariae* it is of a more dull brown and more blackish-grey. In *verbasci* the brownish or violaceous yellow of the disc becomes appreciably lighter at its contact with the brown of the inner margin, particularly slightly before and behind the whitish crescent formed by the approach of the penultimate loop on the inner side of the waved line. In *scrophulariae* the yellow portion of the disc becomes much less clear (light) at this place and occasionally fades away. Finally, in *verbasci* ♂ the brown of the hindwing extends over the disc and is actually darker than in *scrophulariae*. In both species the denticulation of the wings is quite pronounced and it is a little more so in *verbasci* than in *scrophulariae*."

Tutt gave various opinions of others more or less nebulous and also an account of his own breeding with larvae from Kent, which he personally considered to be our British form of *scrophulariae*. I have two of these specimens, but these are not identical with either *verbasci* or *lychnitis*, nor are they comparable to my Continental so-called *scrophulariae*.

Barrett said of this species :

Not variable except in size. He also stated " I do not find any instance of the moth in this country ; all the specimens in collections seem to have been reared from larvae found on flowers of mullein."

*scrophulariae*, Capi., is a good species on the Continent, but it does not seem to have been identified here with absolute certainty. The other seven or eight British species are identified by their life-history with more certainty. As regards British *scrophulariae* Dr Cockayne points out that about 1867 Doubleday sent larvae of *scrophulariae* to Buckler. Figures of them were published in the Ray Society's vol. vi of Buckler's Larvae. Dr Cockayne has seen the original water colour figures of Buckler's work, which are now in the possession of Mr S. G. Castle-Russell, and his comment is, " I think they do represent *scrophulariae*, Cap., though the most reliable feature, the grey intersegmental line, is not shown. It cannot be shown in a living larva."

#### CUCULLIA LYCHNITIS, Rambr.

Tutt remarks on this species:—" The superior wings are very narrow, slightly toothed, with the lower half of the fringe darker, of a very clear yellow-ochreous neither tinted with reddish nor with grey, the pale part which is above the inner triangle, reduced to a single indistinct white spot before the crescent; the triangle less intense and reduced almost to a single black line shaded with brown on both sides. The dark costal shade having a washed-out appearance, ashy, pale. The ordinary stigmata paler than the ground colour and distinctly surrounded with dots. The inferior wings very pale, the nervures slightly dark and without a cellular lunule."

Barrett said of the Variation :

Not variable, except in size, and in this respect our largest examples seem to be inferior to some of those from abroad.

var. *rivulorum*, Gn., *Hist. Nat. Noctuae*, II, 129 (1852).

ORIG. DESCRIPT.—" A little larger. Forewings a little more dentate, with warmer ochraceous, with a darker costa, very uniform, with a blackish centre, the stigmata encircled by dots. The lower wings darker, with a stronger central spot. The last joint of the palpi more obtuse, and more truncate at the top." S. France, but is now treated as a sp. (non Brit.).

This was for a long time taken to be a form of *lychnitis*.

Stdgr., *Cat.*, IIed., 122 (1871).

#### CUCULLIA ASTERIS, Schiff., Fab.

Tutt said that " There are some slight points of variation in this species. The ashy or slaty colour in the centre of the wing is sometimes paler than in others and there is also a slight variation in the width of the darker costal area producing a corresponding change in the central area."



Of the Variation Barrett said:

Hardly variable except that specimens obtained or reared from the salt marshes of the coast seem to be of a purplish-grey, and those from inland localities rather more of a reddish-grey.

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CUCULLIA GNAPHALII, Hb.

Tutt said that this species was exceedingly rare.

Barrett said of the Variation:

"Apparently not variable." He added, we know little or nothing of the habits of this species in the moth state.

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CUCULLIA ABSINTHII, L.

Tutt said of the Variation that "the strangest point in the Variation of this species is connected with the stigmata. The reniform is made of 4 o's, arranged in contact like a double figure 8; the orbicular is also 8-shaped." He recorded a specimen with orbicular made of 6 distinct dots, another with three, but generally there are only 2.

Barrett said of the Variation:

Usually very constant in colour and markings, merely varying in the extent of the black spotting and bands; but in the collection of Col. Partridge is an ashy-white example having all the markings indistinct. It was obtained at the Isle of Portland.

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CUCULLIA CHAMOMILLAE, Schiff., Fabricius.

Tutt said "The species varies considerably in tint and hence has several named varieties." Tutt dissatisfied with the partial early references supposed to seem to point to this species took the description by Fabricius as the original one of the type (*Mantissa*, pp. 180-1 (1787)). He said "Our English specimens appear to be either the type, a form much streaked with paler, or approaching var. *chrysanthemi*, a dark form much less streaked with the paler tint. I have also a form with a distinct dark blackish brown central band extending from the basal to the elbowed line, the dark band throwing up the reniform rather more distinctly. cf. Gn., *chrysanthemi* " (*Noct.*, VI, 142).

Barrett said of the Variation:

"Variable in depth of colour, especially in the intensity of the central clouding of the forewing, which in some specimens is sooty-black, and graduates in every shade to the normal smoky-grey and to paler; occasional examples being rather pale dull grey with all the nervures visibly darker, and having brownish dashes between them towards the hinder area."

Tutt dealt with three varieties of this species:

var. *calendulae*, Tr., and gave the descriptions of Treit. [*Schm.*, X (2), 127 (1835)]; of Gn. [*Noct.*, VI, 143 (1852)].

var. *leucanthemi*, Rambr., and gave a description of Rambr. [*Cat. Sys. des Lép. de l'Andalousie*, pl. IX, fig. 3 (1858)] and Stdgr.'s Notes.

var. *chrysanthemi*, Hb., and gave a description of Hb. [*Samml. Noct.*, f. 686 (1822)] and of Gn. [*Noct.*, VI, pp. 142-3 (1852)], and suggested that *fissina*, Haw., is a syn., while Treit put it to *calendulae*. ?

Stdgr., *Cat.*, IIIed., 216 (1901), gave *chrysanthemi*, Hb. 686, as an ab. of *chamomillae* (obscurior al. ant. pro. p. nigrescentibus) and ab. (v.) *calendulae*, Tr. (dilutior, al. ant. cinerascens, minus signatis). He treated *lucifuga*, Dup., as a Syn., and var. *leucanthemi*, Ramb. (al. ant. flavo-mixtis, vix nominanda.).

Hampson gave short descriptions of the following forms [*Lep. Ph.*, VI, 41 (1906)]:

ab. *chrysanthemi*. Forewing largely suffused with fuscous.

ab. *calendulae*. Forewing greyer and less strongly marked.

ab. *leucanthemi*. Forewing with a slight yellowish tinge. Andalusia.

Splr., *Schm. Europas*, I, 273 (1907), gave the following forms:

ab. *chrysanthemi*, Hb., darkened brownish-black.

ab. *calendulae*, Tr. (r. *wredowi*, Costa nom prius), paler with ashy-grey forewings and sparse, delicate marking.

ab. *leucanthemi*, Ramb., more yellowish mixed. Andalusia. Widely distributed.

Warr.-Stz., *Pal. Noct.*, III, 105 (1910), gave the same three forms and placed *fissina*, Haw., as a syn. of *calendulae* and *lucifuga*, Dup. nec Hb., also a syn. They figured *chrysanthemi* and *calendula* on plt. 26h.

Draudt-Stz., *Pal. Noct. Supp.*, III, 122 (1834), gave an Algerian form *amoenissima*, Obthr., but think it is the *wredowi*, Costa, which they place as a good species.

Culot, *N. et G.*, I (2), 119, plt. 61, f. 11-13 (1915), gave the two forms *chrysanthemi* and *calendulae* and figured them on plate 61f. 12-13.

var. *amoenissima*, Obthr., *Lep. comp.*, VI, 169, plt. 496, fig. 4129 (1918).

ORIG. DESCRIP.—“Smaller, with grey ground colour, brighter, showing the neater and more defined markings.”

### CUCULLIA UMBRATICA, Linn.

Of the Variation Tutt said, “The Kent and Sligo specimens have pale males and comparatively dark females with a strong tinge of ochreous. In the specimens from Morpeth and Darlington, the males and females are equally dark, but the hindwings of both forms are much paler in the males than in the females.”

Early authors made three or four species out of this variation.

Humphrey and Westwood diagnosed them thus:—

1. *umbratica*, L., “has the front wings a paler grey than the others, with the tinting in front rather pale ochreous than brown, while the hindwings are very clear, and with a suffused narrow border of light brown,” plt. 49, 6-7.

2. *tanaceti*, Haw., "has the grey stronger, and the ochreous tint becomes brown in the forewings, and the hindwings have a broader and darker border or shade at the edge," plt. 49, 8-9.
3. *lucifuga*, Haw., "has still more brown in the forewings, and the hindwings are entirely dusky brown with a narrow fringe somewhat paler," plt. 49, 12-13, 17.
4. *lactucae*, Haw., "is very similar but has the forewings relieved here and there with a clearer grey, while the hind-wings, though all brown are lighter near the body and have a broadish pale fringe," plt. 49, 10-11.

Tutt's notice of these three names:—"There are of course distinct Continental species with the above names, which species, our early British authors believed their varieties of *umbratica* to be, but as the knowledge of our British species increased, it was discovered that the forms thus described did not correspond with the distinct Continental species bearing the same names."

Barrett gave the Variation as follows:

Variable in size and also in the depth and degree of dark shading upon the forewings, which become in the west of Ireland and in Scotland rather of a blackish-grey.

Stdgr., *Cat.*, IIIed., 216 (1901), gave as Synonyms *lucifuga*, Esp., *lactucae*, Hb., and *sonchi*, Hein., but no aberrations.

Hamp., *Lep. Phal.*, VI, 43, gave no aberrations but treated *lucifuga*, Esp. (nec Schiff.), *lactucae*, Hb. (nec Esp.), *tanaceti*, Steph., and *sonchi*, Hein., all as Syn.

Splr., *Schm. Eur.*, I, 271 (1906), added ab. *albida*, after discussing the variation.

Warr.-Stz., *Pal. Noct.*, III, 105 (1910), gave as Syns. *lucifuga*, Esp. (nec Schiff.), *lactucae*, Hb. (nec Esp.), *tanaceti*, Steph. (nec Schiff.), and *sonchi*, Hein. They give no forms

Culot, *N. et G.*, III, 117 (1910), gave no ab. and no syn.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 122 (1934), gave three new forms, *rhodana*, Cabeau, *obscura*, Buresch, and *albida*, Splr. A roseate, a melanic, and a pale whitish form. The last may be the *clarior*, Fuchs. (a species).

ab. *albida*, Splr., *Schm. Eur.*, I, 271 (1906).

ORIG. DESCRIP.—"There occur as Freyer well portrayed (plt. 447), females with the hindwings coloured as in the darker males also the body and fringes of the forewings in part, perceptibly whitish ashy-grey."

ab. *rhodana*, Cabeau, *Revue Namur.*, XXIII, 14 (1923).

ORIG. DESCRIP.—"Anticis insuper alis non griseocinereis sed nitide roseis." Au recto, "les ailes antérieures sont, non d'un gris cendré sed d'un rose clair."

ab. *obscura*, Buresch., Arb., *Nat. Ges. Bulg.*, VII, 81 (1835 ?).

DESCRIP.—[Drdt.-Stz., *Pal. Noc. Supp.*, III, 121 (1834) "A melanic form described from a single specimen from Sofia."



The other names which have been brought into this consideration of *umbratica* may be considered as Synonyms so far as known at present. Several represent good species as *tanaceti*, Schiff. (Haw., Steph., Hum-138 phreys).

CHARICLEA (HELIOTHIS) UMBRA, Hufn.

*Chariclea*, Steph. (1829), Tutt, Barr. [*Caradrina*, Hb. (1821), Meyr., Meyr.; *Pyrrhia*, Hb. (1822), Stdgr., Splr., South, Hamp., Warr.-Stz., Hamps., Drdt.-Seitz.; *Heliothis*, Ochs. (1826), Steph., Dup., Gn., Tutt] Hamps., Drdt.-Seitz; *Heliothis*, Ochs. & Treit. (1816-26), Steph., Dup., Gen., Tutt] *umbra*, Hufn. (1766) (*marginata*, Fb. (1775)).

Tutt, *Brit. Noct.*, III, 122 (1892): Meyr., *Handbk.*, 119 (1895): Barr., *Lep. Br. Is.*, VI, 148, plt. 24 (1900): Stdgr., *Cat.*, III ed., 224 (1901): Splr., *Schm. Eur.*, I, 284, plt. LI, 6 (1907); South, *M.B.I.*, II, 47, plt. 17, 10-11 (1905): Warr.-Stz., *Pal. Noct.*, III, 227, plt. 66b (1910): Hamp., *Lep. Phal.*, IX, 54 (1910): Culot, *N. et G.*, I (2), 140, plt. 65, f. 9 (1915): Meyr., *Rev. Hbk.*, 72 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 188, plt. 226 (1935).

Schiff., *Verz.*, 86.S (1775), gave this insect the name *rutilago* apparently ignorant of the *umbra*, Hufn. (1766).

Ernst. & Engr., *Pap. d'Eur.*, VII, 105, fig. 480a, b (1791) described and figured this species under the name *chrysographa*. Fig. 48c is given as the underside, ♀. The figures are very good but somewhat too strongly coloured.

Esp., *Abbild.*, *Noct.* (2), 26, plt. 185, 7-8 (1796), under the name *umbrago* gave a very fair figure of *umbra*.

Bork., *Naturg.*, IV, 672 (1792), *umbra*, and 674, *rutilago*, seems to have confused these two species or names. See Illiger's Notes.

Illiger., *Verz. Ausg.*, I, p. 304 (1801), cited *umbra*, Bork., IV, 672 (1792), *umbra*, Esp., and *marginata*, Fab., E.S., III (2), 88, as synonyms. He then discussed the various citations and decided that *umbra*, Bork., was *rutilago*, Schiff., and that the citation of *rutilago*, Schiff., must be changed to *umbra*. He noted that Fab., l.c., III (2), 75, *rutilago* was a good sp. or an ab. of *aurago*, Schiff. (cf. Wernbg., *Beitr.*, II, 180).

Haw., *Lep. Brit.*, II, 235, 1809, described this species under the name *marginago* and gave as synonym *marginata*, Fb., and cited Donovan, *Brit. Ins.*, plt. 150. Subsequently Haw. found that under this species Don. had copied Fab., who had given the name *marginata* to an American insect, and which had been altered to the name *marginella*, etc., a real muddle.

Hb., *Saml. Noct.*, 185 (1800-3), gave a good figure under the name *rutilago*. See H.-S. below.

Dup., *Hist. Nat.*, VII (1), p. 319, plt. 119, 8, used the name *marginata*, Fb., gave a clear figure with the forewings of an almost uniform ground colour "of a beautiful golden yellow slightly darkened by red brown, with a wide terminal band of this same colour with a purple reflection." The figure does not show the terminal band.

Treit., *Schmett.*, V (3), 232 (1826), took the name *marginata*, Fab., *Ent. Sys.*, III, 2, 88 (1792), as the name for this species and yet he cited

*umbra*, Hufn., *rutilago*, Schiff., *umbrago*, Esp., *conspicua*, Bork., as synonyms; this seems to show that he knew very little, if anything, of this species.

H.-S., *Bearb. Sys. Noct.*, II, 220 (1846), cited *rutilago*, Schiff., Hb. 185, *umbrago*, Esp., *conspicua*, Bork., as synonyms. Of Hb. 185 he said ground of 1 and 2 too unevenly coloured, the outer transverse line much too thick.

Gn., *Hist. Nat. Noct.*, VI, 2, p. 178 (1852), under the name *marginata*, which he adopted from Kleeman, *Beitrag*, II, plt. VII, 6-8. cited *rutilago*, Schiff., *umbrago*, Esp., *conspicua*, Bork., *chrysographa*, Ernst. & Engram., and *marginago*, Haw., as synonyms. He said that the *marginata* Don. was not this species but *purpurites*.

Moore, *Ann. M.N.H.* (5), 1, p. 232 (1878), redescribed *umbra* from Thibet under the name *tibetana*.

Stdgr., *Cat.*, IIIed., 224 (1901), gave as synonyms *marginata*, Fb., and *rutilago* (Schiff), Hb. *Pyrrhia*.

Splr., *Schmett. Eur.*, I, 284, plt. LI, f. 6 (1907), gave a figure with very dark terminal band on the f.w. He called this form ab. *marginata*, F. The form with base of forewings darkened is the ab. *rutilago*, Hw.

South, *M.B.I.*, II, 47, plt. 17, f. w-11 (1908), gave two excellent figures.

Hamp., *Lep. Phal.*, IX, 54 (1910), treated *marginata*, Fab., *rutilago*, Schiff., *conspicua*, Bork., *umbrago*, Esp., *marginago*, Haw., as synonyms as well as four American forms, *angulata*, Grote, *tibetana*, Mr., *vexilliger*, Christ., and *aconiti*, Holtz.; these two he treated as aberrations, *cilisca*, Gn., *exprimens*, Wlk.

Warr.-Stz., *Pal. Noct.*, III, 227 (1911), gave ab. *marginata*, Fb., plt. 46b, ssp. *rutilago*, Haw., and gave synonyms *umbrago*, Esp., *conspicua*, Bork., *marginago*, Haw., *tibetana*, Mr., *vexilliger*, Christ., and *aconiti*, Holtz., plt. 46g.

Culot, *N. et G.*, I (2), p. 140, plt. 65, f. 9 (1915), gave an excellent figure as *umbra*, Hufn., with *marginata*, F., as a syn.

Drdt.-Stz., *Pal. Noct. Sup.*, III, 188 (1935), have treated *vexilliger*, Christ., as a definite form of *umbra* and not as a syn. They gave *exprimens*, Wlkr., as a form, with *angulata*, Grote, and *aconiti*, Holtz., as synonyms, all having occurred in the Palaearctic Region, Siberia, Russia and Finland.

Of the Variation Barrett said:

Not very variable, but the ground colour ranges from orange yellow to pale yellow, and the outer dark band from purple-red to purple-grey. On the east coast of Scotland, where it occurs very locally, the ground colour is more dull and is clouded in some degree with reddish-brown.

The Forms and Names to be discussed:

*umbra*, Hufn. (1766), *Berlin Mag.*, III, 294.

ab. *marginata*, Fab. (1775), *Sys. Ent.*, 610.

ab. *rutilago*, Schiff. (1775), *Verz.*, 86.

*chrysographa*, Schiff. (1775), *Verz.*, 86. S.

*conspicua*, Bork. (1792), *Naturg.*, IV, 612. S.

*umbrago*, Esp. (1796), *Abbild.*, IV, plt. 185, 7-8. S.



*purpurina*, Esp. (1798), *Abbild.*, IV. A sp. S.  
*rutilago*, Haw. (1809), *Lep. Brit.*, 235. S.  
*cilisca*, Gn. (1852), *Hist. Nat.*, VI, 178. Am. S.  
*exprimens*, Walk. (1857), *Cat. B.M.*, XI, 687. Am., Canada. S.  
*angulata*, Grote (1874), *Bull. Buff. Socy.*, II, 85, pl. III, 5, 6. Am., Buff.  
*tibetana*, Mr. (1878), *A.M.N.H.* (5), I, 232. N. Indian form. S.  
 ab. *vexilliger*, Christ. (1893), *Iris.*, VI, 92.  
*aconiti*, Holz. (1903), *Allg. Zt. Ent.*, VII, 212.

Tutt dealt with (1) the Hufn. typical form orange-yellow with reddish-yellow bands on hind margins. (2) the *marginata*, Fb., with bands less strong or less red but more yellow. (3) ab. *rutilago* (slight variety), Haw., "basal line darker than central shade." Forms a fascia.

race *cilisca*, Gn., *Noct.*, II (VI), 179 (1852).

ORIG. DESCRIP.—Compared with *marginata*. The upper wings are of a still more vivid and more strongly powdered red. The lines also are of a still more pronounced red, as well as the colour of the spots, of which the reniform is rather tinged with red than brown. The brown-purple subterminal band is more plainly limited by the lunules of the subterminal, and the terminal space becomes of the ground-colour; the band of the lower wings is not blackish, but of a vinous-red, and all the markings below are of the same."

This species has a very different appearance from *marginata* at first glance; one takes it for a *Xanthia*.

race *exprimens*, Walk., *Cat. B.M.*, XI, 687 (1857).

ORIG. DESCRIP.—Cervina (fawn colour); abdomen pallidum; alae antice apud medium obscuriores, lineis transversis angulosis ferrugineis, lineis medianis nigricantibus undulatis, orbiculari et reniformi magis ferrugines marginatis; postuae testaceae, litura discali nigricante, margine lato nigro-cupreo.

"♂ Fawn colour. Abdomen paler than the thorax. Forewings with transverse, angular, ferruginous lines; median lines blackish, undulating, more distinct than the others, and with the adjoining part of the wing darker than the latter elsewhere; orbicular and reniform spots large, with ferruginous borders. Hindwings testaceous, with a blackish discal mark and broad blackish cupreous borders, which have a bright cupreous margin." Orilla, W. Canada.

Hamp., *Cat. Lep. Ph.*, IX, 55 (1910). Forewings with the post-medial and terminal areas suffused with red-brown. Canada and the U.S.A.

race *angulata*, Grote, *Trans. Am. Ent. S.*, V, 93 (1874).

ORIG. DESCRIP.—"Congeneric with *exprimens* which it resembles and which appears to be the American representative of the European *umbra*. Easily recognised by the angulated distinct median shade and the pale yellow-secondaries. Thorax and f.w. brownish-red. Tip-line very fine, thrice waved, perpendicular. Orbicular finely ringed, concolorous, with central dot. Median shade extremely prominent, angulate on the median vein within the base of the clouded reniform, denti-



culate superiorly, even inferiorly blackish. The wing is lighter tinted from the base to this median shade. T.p. line black, very oblique, heavily marked, followed by a dark shading over the subterminal space. S.t. line uneven, interspaceally scalloped; fringes bright tinted; an extremely fine marginal line. Hindwings light yellow with blackish borders narrowing to apices and internal angle. Beneath yellow, the costa of secondaries and the narrower terminal band rosy speckled and tinted." Buffalo.

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#### HELIOTHIS, Ochs., DIPSACEA, L.

Tutt in *Brit. Noct.*, III, 123 (1892), dealt with this as a species with var. *maritima*, a form which had been considered by its describer Graslin as a good species in 1855. Graslin found no support for his opinions, although it was based on two quite distinct localities, *dipsacea* always on heathy ground inland and *maritima* on sandhills near the sea, and a slight difference of facies.

In the February number of the Danish periodical "Flora and Fauna" Skat Hoffmeyer, a great friend of the late Rev. C. R. N. Burrows, showed that there were two species differentiated by their facies and structure as well as by their biologic behaviour.

In the same year I reviewed the position in a paper given before the S. London Entomological and N.H. Society, 8th September 1938, which was published later with 3 plates.

*H. dipsacea* has the central shade, or band, mostly quite definite, more uniformly coloured, meeting the inner margin at right angles, and structurally the uncus has only one curve and is straight in the lower half.

P.S.—The figures given by South on plate 18 under the name *dipsacea* are good figures of *maritima*, not of *dipsacea*.

*H. maritima* has slightly narrower wings, thus rendering the apex more acute and the outer margin more oblique; the central shade is very oblique to the inner margin; quite variously coloured and often marked with short black shades in the costal portion of the wings; and structurally the uncus is bent both sides and S-shaped in section.

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*Heliothis*, Ochs. & Treit. (1816-25), Dup., Frr., S.-S., Gn., Ed., Meyr., Barr., Stdgr., Splr., Sth., Culot, Meyr. [*Chloridea*, Westw. (1841), Hamp., Warr.-Stz., Drdt.-Stz.] *dipsacea*, L. (1767).

Tutt, *Brit. Noct.*, III, 123 (1892): Meyr., *Handb.*, 109 (1895): Barr., *Lep. Br. Is.*, VI, 162. plt. 245, 3 (1901): Stdgr., *Cat.*, III ed., 221 (1901): Hamp., *Lep. Phal.*, IV, 42 (1903): Splr., *Schm. Eur.*, I, 281, plt. 50, f. 40 (1907): Sth. [*M.B.I.*, II, 18, plt. 19, 1-2 (1903)]: Warr.-Stz., *Pal. Noct.*, III, 245, plt. 50i (1911): Culot, *N. et G.*, I (2), 134, plt. 64, 11 (1915): Meyr., *Rev. Handb.*, 92 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1935).

Ernst & Engr., *Pap. d'Eur.*, VIII, 43, f. 553a, b, c (1792), gave three very fair figures, under the name *dipsacea* of many authors. They cited Mad. Merian., *viriplaca*, Hufn., Esper, plt. 172 (descrip. not pub. in 1792) and many others.

Esp., *Abbild. Noct.*, IV, 641, plt. 172, figs. 1, 2, 3 (var.), called *dipsacea*, but with little resemblance to that species either in marking or colour; unrecognizable. Werneb. said *dipsacea*, Beitr.; II.

Hb. *Samml.*, 311 (1800-3), gave a fig. *dipsacea* but not clear and distinct and which does not seem different enough from our later *maritima*.

Treit., *Schm. Eur.*, V (3), 220 (1826), cited Hufn., *Berl. Mag.*, Ernst & Engr., 555 ?, Esper, f. 172, Schiff., *Verz.*, 89, W. 3.

Dup., *Hist. Nat.*, VII (a), 304, plt. CXIX, f. 2, gave an almost unrecognizable figure of a deep green with black-brown bands and hind-wing by no means correct. The description is equally incorrect.

Frr., *Neu. Beitr.*, V, plt. 491 (1845), gave a quite distinct *dipsacea* with rather extended size and irregularity of band.

H.-S., *Sys. Bearb.*, II, 366 (1849), said Hb.'s fig. was too green.

Gn., *Hist. Nat.*, VI (2), 181 (1852), dealt with *dipsacea* as depicted by Hb. 311.

Led., *Noctuinen Eur.*, p. 230, gave a descript. of a form of *dipsacea* from many areas of Europe, etc., of which the larvae feed on *Spergularia*. This he named var. *spergulariae*. It is generally considered to be a *dipsacea* form from its having the same distribution.

Stdgr., *Cat.*, Ed. III, 221 (1901), gave *maritima* as a var., and *spergulariae*, Led., as a synonym of it. He also gave the American *phlogophagus*, Grote, as a var. of *dipsacea*.

Hamp., *Lep. Phal.*, IV, 42 (1903), treated *maritima* as an aberration and *adaucta* as a syn. as well as *spergulariae*.

Splr., *Schm. Eur.*, I, 281, plt. 50, f. 40 (1907), gave a very good figure and dealt with ab. *albida*, Fuchs., and *phlogophaga*, Grote & Rob. (Amer.).

South, *M.B.I.*, II, 48, plt. 19, fig. 1-2 (1908), gave two figures of the lighter specimens of S. England to which the name race *maritima* has been given. The typical form of the species is darker.

Warr.-Stz., *Pal. Noct.*, III, 245, plt. 50i (1911), gave six very good figures; *dipsacea*, typical, *adaucta*, Btlr., ♂-♀, Japan, *albida*, Fuchs., with a new one ab. *canariensis*, ♂-♀.

Culot, *N. et G.*, I (2), 134, plt. 64, fig. 11 (1915), gave an excellent figure and discussed at length the two species *dipsacea*, L., and *maritima*, Gras. (plt. 64, figs. 12-13, *maritima* fig. 12, fig. 13 = ab. *fulva*, ??

Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1935), added ab. *tristis*, Strnd., and *salmatina*, Fdz. They also added a figure of a typical *maritima*, Gras.

Of the Variation C. G. Barrett said:—

Not very variable, but examples from the New Forest district of Hants. are rather smaller and darker in colour and also more strongly marked than those from the Eastern Counties. In the collection of Prof. Meldola is one in which all the usual black markings of the hind-wings are of a glossy light red; it was taken in Essex.



Tutt dealt with: (1) typical *dipsacea*; (2) ssp. *maritima*, Gras.; (3) the American *luteitinctis*, Grote., taken to be a form of *dipsacea* from the Western States; (4) *interjacens*, Grote, from the New York area. The last two have since been determined as true species.

The following Notes are taken from my paper read to the S. London Ent. and N.H. Society in 1938 and published in their Proceedings for 1938-9. In this I have summarized the information collected by Herr Draudt in the journal "Ent. Rund.," 15th April 1938.

**CHLORIDEA MARITIMA**, Gras. The forms are:—

Subsp. *septentrionalis*, Hffmyr.—"Has a dark shade at the base of the forewing just below the median vein, a feature not possessed by *dipsacea*, nor by any other form of *maritima*." Britain, etc.

Subsp. *adaucta*, Btlr.—"Described as a species from Japan, characterized by its large size and more fulvous colour, the underside of both wings yellow with outer margin towards the apex fulvous, and all black markings enlarged and intensified."

Subsp. *bulgarica*, Drdt.—"Much larger and very oblique median band of a warm colour of greenish olive-yellow to olive-green with the ground of the wings white and without a longitudinal basal shade. It flies with ordinary typical *dipsacea*."

Subsp. *centralasiae*, Drdt.—"Small, dull clay yellowish insects, evidently a *maritima* form to all appearance adapted to desert conditions." Aksu. A few specimens.

ab. *albida*, Warr.-Stz.—"Whitish forewings, with a very feeble median band, the hindwings with a pure white band and a pure white spot." Cf. Fuchs.? Crimea.

Subsp. *angarensis*, Drdt.—"Large bands below of deep black with an intense yellow-red clouding." Chinese.

ab. *ferruginea*, Splr.—"The very red fulvous form, the hindwings of a deeper yellow. See Culot's figure, hindwings of a deeper yellow."

**CHLORIDEA DIPSACEA**, L. The forms are:—

ab. *tristis*, Strand.—"A dark greenish-grey form with increased black on the hindwings."

ab. *salmatina*, Fdž.—"With a slightly reddish hue and smaller, the hindwings not yellowish and the central spot not joined to the marginal band but isolated." Salamanca, Spain.

ab. *canariensis*, Warr.—"Somewhat red forewings and yellowish-white hindwings." Canaries.

**HELIOTHIS PELTIGERA**, Schiff.

*Heliothis*, Ochs. & Treit. (1816-25), Steph., Frr., Meyr., Stdgr., Splr., South, Culot, Meyr.: *Chloridea*, Wstwd. (1841), Hamp., Warr.-Stz., Drdt.-Stz.

Tutt, *Brit. Noct.*, III, 127 (1892): Meyr., *Handb.*, 109 (1895): Barr., *Lep. Br. Is.*, VI, 158, plt. 245 (1900): Stdgr., III ed., 221 (1901): Hamp., *Cat. Lep. Phal.*, IV, 42 (1903): Splr., *Schm. Eur.*, I, 282, plt. 50, f. 45 (1907): South, *M.B.I.*, II, 50, plt. 19, 4-5 (1908): Warr.-Stz., *Pal. Noct.*, III, 246, plt. 50k (1911): Culot, *N. et G.*, I (2), 136, plt. 44, 1-5 (1915):



Meyr., *Rev. Handb.*, 92 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1934).

Ernst & Engr., *Pap. d'Eur.*, VIII, 47, f. 555a (1792), gave a good but rich coloured figure under the name *peltigera*, too bright for most specimens we know in Britain, and cited only Schiff. 89 W. 2. They quoted Esper's figure, plate 135 (description not published then).

Esp., *Abbild. Noct.*, IV (2), 422, plt. 135, 2 (1788), gave a good figure of *peltigera* under the name *florentina*.

Steph., *Ill.*, III, 109 (1829), said it was very variable: the costal clouds may be obsolete, and the hind margin has sometimes a dusky fascia; the anterior wings entirely fuscous and usual markings more distinct.

Treit., *Schm. Eur.*, V (3), 227 (1826), cited Ernst & Engr. 555, Esp. 135, Schiff. 89 W. 2.

Dup., *Hist. Nat.*, VIIa, 313, plt. 119, 5 (1827), gave a very good figure of a grey form.

Frr., *Neu. Beitr.*, II, 167, plt. 167 (1936), gave a very hard figure with rigid lines, in fact a bad figure.

H.-S., *Syst. Bearb.*, II, 366 (1849), gave *alpheia*, Cr., *barbara*, F., *florentina*, Esp., *scutigera*, Brk., *straminea*, Don. as synonyms, but makes no comment.

Gn., *Hist. Nat.*, VI (2), 180 (1852), dealt with *peltigera*, Schiff., of which he stated *barbara*, Fb., *alpheia*, Cr., *florentina*, Esp., *scutigera*, Bork., and *straminea*, Don. were Synonyms.

Stdgr., *Cat.*, IIIed., 221 (1901), gave *florentina*, Esp., as a syn.

Hamp., *Cat. Lep. Phal.*, IV, 42 (1903), gave the five names by which the species had been known, and described a form from S. Africa which Strand subsequently named *aurantiaca*.

Splr., *Schm. Eur.*, I, 282, plt. 50, f. 45 (1907), gave a very good average form and dealt with the form *nubigera*, Splr.

South, *M.B.I.*, II, 50, plt. 19, figs. 4-5 (1908), gave two good figures.

Warr.Stz., *Pal. Noct.*, III, 246, plt. 50k (1911), gave no aberrations but listed the following synonyms: *alpheia*, Cram., *florentina*, Esp., *charmione*, Stoll, *barbara*, Fb., and *straminea*, Don.

Culot, *N. et G.*, I (2), 136, plt. 64, 15 (1915), gave a very good soft figure. He gave a detailed list of characters by which it was to be distinguished from the nearly related *nubigera*, H.-S., of S. Europe (figs. 16-17).

Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1934), added two fresh abs., *condolens*, Schaw., and *clarissima*, Trti.

Of the Variation Barrett said:—

Variable in the intensity of the ground colour of the forewings from pale creamy-brown or buff to rich tawny and chestnut-red. Along with such extreme forms, in the collection of Mr Sydney Webb is one in which the blotch at the reniform stigma is the only noticeable marking. One in the cabinet of Mr Chas. Fenn has a large whitish blotch in the dark border of the hindwings.

The Names and Forms to be dealt with follow:—

*peltigera*, Schiff., *Verz.*, 89 (1775).

*alpheia*, Cram., *Pap. Exot.*, III, 99, plt. 250, f. (1779). S.

*florentina*, Esp., *Abbild. Noct.*, IV, 422, plt. 135, 2 (1788). S.  
*charmione*, Stoll, *Pap. Exot.*, V, 162, plt. VI, 10 (1791). S.  
*barbara*, Fb., *Ent. Sys.*, III (2), 111 (1794). S.  
*straminea*, Don, *Brit. Ins.*, II, plt. 61 (1813). S.  
*ab. pallida*, Ckrl., *Ent.* (XI, 24), XXII, 4 (1889).  
*ab. condolens*, Schwrd., *Iris*, XXXV, 121 (1914).  
*ab. aurantiaca*, (Hamps.), Strand (*Cat. Lep. Ph.*, IV, 42), *Arch. Nat.*,  
 LXXXI, 143, A. 12 (1915).  
*f. clarissima*, Trti., *Att. Soc. It. Sci. Nat.*, LXIII, 101, fig. (1924).  
*var. insulata*, Navas., *Junt. Cien. Nat.*, IV, 35 (1924).

*ab. ♀ aurantiaca*, (Hampson), *Cat. Lep. Phal. B.M.*, IV, 42 (1903).

ORIG. DESCRIP.—“Hindwing orange-yellow.” S. Africa. This form was named by Strand in (1915) *Arch. Natg.*, LXXXI, 143, abt. A. Heft. 12.

Tutt dealt with: (1) the typical form Hub. figured 310 and (2) *pallida*, a very light coloured specimen.

*ab. condolens*, Schwrd., *Verh. Zoo. Bot. Ges.*, LXIV, 365 (1914).

DESCRIPTION.—Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1934). “Dark specimens from southern localities with dark brown to black-brown markings. The marginal band of hindwings is deeper black and wider, the pale patch suppressed.

*f. clarissima*, Trti., *Att. Soc. It. Sci. Nat.*, LXIII, 101, fig. (1924).

FIGURE—*l.c.*, plt. IV, f. 6. A very good figure (col.).

DESCRIPTION.—Drdt.-Stz., *Pal. Noct. Supp.*, III, 197 (1934). “With very pale sulphur yellow forewings, on which only the apical patch and reniform stigma are apparent, the subterminal band is only indistinctly indicated, all other marking quite extinct. Hindwings similarly pale yellowish with grey marginal band and distinct discal lunule.” Cyrenaica, Bengasi.

The results of experimental work which has very recently been done with regard to this species will be given in the Appendix to Vol. III, which will shortly be in hand.

#### HELIOTHIS ARMIGERA, Hb. (OBSOLETA, Fb.).

*Heliothis*, Ochs. (1816), Treit. (1826); Dup., Frr., H.-S., Gn., Meyr., Stdgr., Splr., South, Culot, Meyr.: *Chloridea*, Westwd. (1841), Hamp., Warr.-Stz., Drdt.-Stz.: *Thalpophaga*, Walk. (1858).

Tutt, *Brit. Noct.*, III, 128 (1892): Meyr., *Handb.*, 91 (1895): Barr., *Lep. Br. I.*, VI, 152, plt. 245, 1 (1900): Stdgr., *Cat.*, IIIed., 222 (1901): Hamp., *Cat. Lep. Phal.*, IV, 45, fig. 18 (1903): Splr., *Schm. Eur.*, I, 282, plt. 51, 1 (1907): South, *M.B.I.*, II, 52, plt. 19, 6-8 (1908): Warr.-Stz., *Pal. Noct.*, III, 246, plt. 50k (1911): Culot, *N. et G.*, I (2), 137, plt. 64, 18 (1915): Meyr., *Rev. Hand.*, 91 (1925).

Ernst & Engram., *Pap. d'Eur.*, VIII, 47, fig. 555 (1792), gave good figures under the name *peltigera*.



Wernb., *Beitr.*, II, 124, said that the figures did not show the characteristic markings of *peltigera*, the black spot, the reniform, and above all the commencement of the waved line.

Hb., *Samml. Noct.*, 370 (1803-8), gave a good figure not to be confused with *peltigera*.

Ochs., *Schm.*, IV, 91 (1816), placed *armigera* as a var. of *peltigera*.

Treit., *Schm.*, V (3), 230 (1826), cited only Hb. 370 (1826), had numbers of it from Dalmatia.

Dup., *Hist. Nat.*, VII (1), 316, plt. cxix, 6-7 (1827), gave two excellent figures: two types, one very red and the other much paler with a ruddy tinge on the submarginal band.

Frr., *Neu. Beitr.*, III, 18, f. 203 (1839), gave a good fig.

Gn., *Hist. Nat.*, VI (2), 181 (1852), dealt with *armigera*, Hb., as figured by Dup., *Hist. Nat.*, IV, plt. 119, fig. 5-6 [error for 6-7].

Splr., *Schm. Eur.*, I, 282, plt. 51, f. 1 (1907), gave a rather pale form of this species and dealt with ab. *fusca*, Ckrll., and *umbrosa*, Grote. (Amer.)

South, *M.B.I.*, II, 52, plt. 19, figs. 6-8 (1908), gave three good figures of this almost cosmopolitan species of which odd examples have been captured in this country long distances apart, and it varies considerably in other parts of the world.

Warr.-Stz., *Pal. Noct.*, III, 246, plt. 50k (1911), under the name *obsoleta*, Fb., gave a good figure, and held the following names as Syns., *armigera*, Hb., *pulverosa*, Hb., *conferta*, Walk., *uniformis*, Wllgrn., *punctigera*, Wllgrn., *umbrosus*, Grote (Amer.), and *insularis*, Walk. They recorded the forms ab. *fusca*, Ckrll. (50k), ab. *rubescens*, Walk., and named a reddish form, ab. *rufa*, fig. 50l.

They also gave *graslini*, Rmbr., as a good species, but did not figure it, and gave the fulvous ab. *ferruginea*, Splr.

Culot, *N. et G.*, I (2), 137, plt. 64, f. 18 (1915), gave an excellent figure.

Of the Variation Barrett said:—

Variable in the depth of colour of the forewings and distinctness of their markings, the latter sometimes almost filling up the whole wing, in other cases almost absent, leaving the whole surface softly shaded with reddish-brown on a creamy ground.

The Names considered:—

*obsoleta*, Fb. (1793), *Ent. Sys. auct.*, III (1), 456.

*armigera*, Hb. (1802-8), *Samml. Noct.*, 370. S.

*pulverosa*, Walk. (1857), *Cat. Brit. Moths*, XL, 688. S.

*conferta*, Walk. (1858), *l.c.*; 690. S.

*rubescens*, Walk. (1858), *l.c.*; XV, 1681. S.

*insularis*, Walk. (1858), *l.c.* S.

*uniformis*, Wllgrn. (1860), *Wien. ent. Mon.*, IV, 171. S.

*punctigera*, Wllgrn. (1860), *l.c.*, S.

ab. *fusca*, Ckrll. (1878), *Ent.*, XI, 24.

ab. *ochracea*, Ckrll. (1889), *l.c.*; XXII, 4.

ab. *umbrosus*, Grote (1892), *Brit. Noct.*, 128. Amer.

ab. *eumaculata*, Grote (1892), *l.c.* Amer.

ab. *rubescens*, Hamp. (1903), *Cat. Lep. Phal.*, IV, 45.



[*hawaiiensis*, (Hamp.) (1903), Strand (1915), *Cat. Lep. Phal.*, IV, 45.]  
*ab. rufa*, Warr.-Stz. (1911), *Pal. Noct.*, III, 246, plt. 50k.  
*ssp. hawaiiensis*, Strnd. (1915), Strand, *Arch. Natg.*, LXXXI, 143, Abt. A, Heft. 12.

The Names given this cosmopolitan species are so confusing and conflicting that only a few that appear to be indicative and useful are given.

Tutt dealt with this cosmopolitan and "excessively variable" species under the name *armigera*, Hb. (1) He described the figure of Hb. 370 as the type, "pale greyish-ochreous, more yellowish towards the basal part, greyer from the angulated line to the outer margin." (2) *ab. fusca*, a dark brown form. (3) A variety designated by Cockerell without a definite description as *ochracea*. (4) *umbrosus*, Grote, larger, of a more olivaceous colour, from America. (5) *immaculata*, Grote, an almost immaculate form of *umbrosus*.

*obsoleta*, Fab., *Ent. Sys. emend. aucta.*, III (1) (1793).

Fab. included this in the "*alis reversis*" of his *Bombyx*. It is the prior description.

ORIG. DESCRIP.—"*β. alis deflexis flavescentibus: macula media strigae postica obsoleta obscurioribus.*" "*Alae flavescentes macula media, obscuriore, postice striga obsoleta punctis minutissimis, fuscis notata. Margo posticus fuscescens. Posticae flavescentes margine postico fusco.*"

This is considered as the prior name of the *Noctua* which has long been called *armigera*, Hb.

*var. rubescens*, Walk., *Cat. Lep. B.M.*, XV, 1681 (1858).

ORIG. DESCRIP.—"Male. Reddish-fawn colour, mostly luteous beneath. Abdomen luteous. Forewings brick-red; lines blackish, undulating, indistinct, somewhat diffuse; exterior line denticulated; orbicular and reniform indistinct, with somewhat darker red borders. Hindwings luteous, with broad dark brown borders; fringe reddish. Wings beneath mostly red exteriorly, with a broad blackish band, which is abbreviated in front of each wing." Moreton Bay.

*ab. rubescens*, Hamp., *Cat. Lep. Phal.*, IV, 45 (1903).

ORIG. DESCRIP.—"Hindwing with the ground colour orange-yellow. (a) Head, thorax and forewing suffused rufous. (b) Head, thorax and forewing suffused dark pink."

*ab. rufa*, Warr.-Stz., *Pal. Noct.*, III, 246 (1911).

FIG.—*l.c.*, 50 l.

ORIG. DESCRIP.—"Commoner in N. Africa and other warm localities, may be separated as *ab. rufa*: this is uniformly dull flesh-colour, with the lines and stigmata hardly visible: it is quite distinct from *ab. rubescens* with orange hindwings."

*ab. hawaiiensis* [Hamp., *Cat. Lep. Phal.*, IV, 45 (1903)], Strand, *Arch. Natg.*, LXXXI, 143, Abt. A, Heft. 12 (1915).

ORIG. DESCRIP.—"With prominent angled median dark brown medial band diffused on outer side." Hawaii.

## ANARTA, Hb., MYRTILLI, L.

*Anarta*, Hb. (1821), Tr. (1826), used by nearly every author [*Melanchnra*, auct., was used by Meyr. only], *myrtilli*, L. (1761).

Tutt, *Brit. Noct.*, III, 128 (1892): Meyr., *Handb.*, 87 (1895): Barrett, *Lep. Br. Is.*, VI, 224, plt. 251, 1 (1900): Stdgr., *Cat.*, III ed., 218 (1900): Hamp., *Lep. Phal. Noct.*, V, 42, fig. 13 (1905): Splr., *Schm. Eur.*, I, 277, plt. L, f. 19 (1907): South, *M.B.I.*, II, 44, plt. 17, f. 1-2 (1908): Warr.-Stz., *Pal. Noct.*, III, 250, plt. 50b (1911): Culot, *N. et G.*, I (2), 125, plt. 63, f. 3 (1915): Meyr., *Rev. Hand.*, 158-9 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 198 (1935).

Rosel., *Ins. Belust.*, IV, P. 85, plt. XI, fig. C (1761), gave a very fair fig. of a distinctly red form but with a sparsity of marking.

Ernst & Enggram., *Pap. d'Eur.*, VII, 48, f. 437 a, b, c, d, e, f (1791), gave a number of figures of this species and cited Linn., XII ed.; Rosel., IV, A.-C.; Schiff., 79, M. 23; Hufn., *ericae*, III, 292. This last was confirmed by Rott., *Natf.*, IX, 114 (1776).

Esp., *Abbild. Noct.*, IV, 582, plt. 165, 1-3 (1791), gave a good figure.

Hb., *Samml. Noct.*, 98 on plt. 21 (not the 98 on plt. 20) (1800-3), gave a very good figure, with the central white spot obsolete.

Curtis, *Brit. Ent.*, III, 145 (1826), gave an excellent figure.

Treit., *Schm.*, V (3), 201 (1826), cited Schiff., 79, M. 23; Hufn., III, 292; Ernst & Engr., 437; Rosel., IV, 9; Esp., IV, 165; Hb., 98.

Dup., *Hist. Nat.*, VII (1), 284, plt. CXVIII, 1 (1827), gave a very red-brown form of which the striking features were (1) the narrow band-like submargin in clear white, more conspicuous by its black margins; (2) the complete absence of the white spot between the stigmata; (3) the very wide black marginal band of the hindwings, and (4) the strongly banded black and impure white abdomen. Again we have a figure of Dup. which does not agree with the description, which refers to the white intermediate spot and another near the base also not in the figure.

Steph., *Illus.*, III, 111 (1829), gave a good description of the ordinary British reddish-brown form, said the variation was in the intensity of colouring and the strength and position of the strigae. He described shortly the deep fuscous form with suffused fuscous tint.

Gn., *Hist. Nat. Noct.*, VI (2), 194 (1852), dealt with *myrtilli*, Roes.

Meyr., *Handbk.*, 87 (1895), actually put *myrtilli* into one of his "pots" along with *oleracea*, *brassicae*, *thalassina*, etc., with *cordigera*, *myrtilla* and *melanopa* at the end of 21 other species in the genus *Melanchnra*. In his *Revised Handbk.*, p. 158, etc., 1928, he boiled this pot again and added two more, of which one was the notorious *essonni*, Hampson. The recent valuable *Check List* by Kloet & Hincks of course disowns *essonni* and admits the genus *Anarta* with its three British species. Meyr. used the genus *Melanchnra* in both editions.

Hamp., *Lep. Phal. Noct.*, V, 42, fig. 13 (1905), gave a very good b. and w. fig., and reported the Canadian *acadiensis*, Beth., as a syn., accepted the *alpina*, Raetzer, Switzerland, as an ab. (=ssp.), and described a form from Hyères, but did not name it.

Spuler, *Schm. Eur.*, I, 277, plt. L, 19 (1907), gave an excellent figure showing the two central spots, the irregular sub-marginal, the costal white vittae all good but not emphasized. He included ab. or subsp. *alpina*, Retzer., and ab. *olivacea*, Fuchs.

South, *M.B.I.*, II, 44, plt. 17, fig. 1-2 (1908), gave two very good figures of this pretty little species.

Rebel., *Berge*, IXed., 263, plt. 37, f. 3b (1910), gave a good figure in which none of the lighter markings were too strongly apparent. He included *olivacea*, Fuchs., in which the hindwing was not yellow but olive-brownish; the ab. *alpina*, Raetz., and a new ab. *snelleni*, Reb., with strikingly black suffusion.

Warr.-Stz., *Pal. Noct.*, III, 252, plt. 50b (1911), gave a good typical fig. and figs. of ab. *rufescens*, Tutt, ab. *peralbata*, Warr., ab. *alpina*, Rtzr., and ab. *citrina*, Warr., all good, and also ab. *albivena*, Haw., ab. *olivacea*, Fuchs., and ab. *nigrescens*, Warr., without figures. Warren invented (unwittingly ?) this name, "*albivena*, Haw." Haworth took Hübner's name *albirena* and instead of putting Hb. as the authority, although he cited Hb. in his reference, he had placed his own name as the authority. The *albirena*, Hb., is *cordigera*. Tutt overlooked the initial error of Haw. and in addition did not treat *albirena*, Haw., as a separate sp. but in error placed it to *myrtilli*, following the example of Stephens (1829), Stephens and Stainton (1856). Warren's improvement (!) to *albivena*, Haw., was followed by Heydemann, and Bainbrigge Fletcher points out (*in lit.*) that Haw.'s use of *albirena* for a British species was invalid.

Culot, *N. et G.*, I (2), 125, plt. 63, f. 3 (1915), gave an excellent figure and dealt with the forms *anglica*, Obthr., *lugens*, Obthr., *virginalis*, Obthr., *citrina*, Warr.

Heydemann, *Int. Ent. Zt.*, XXII, 425 (1929), gave a full account of *Anarta myrtilli* with 8 b. and w. figs.: (1) figs. 1-2 are the typical bright red forms, with distinct white transverse lines and markings common to the South of Britain and generally spread in Germany; (2) fig. 3, the very red form *rufescens*, Tutt; (3) fig. 4, the ab. *peralbata*, Warren, with much white marking; (4) ab. *medio-sanguinea*, Hydmn., in which the whole of the central area of the forewings is of a blood-red tone; (5) ab. *sulphurescens*, Hydmn., figs. 6-8, the three figures represent three forms of the black, white and red mixture. He then refers shortly to *lugens*, Obthr., *alpina*, Ratz., *snelleni*, Rebel., *olivacea*, Fuchs., *nigrescens*, Warr., *virginalis*, Obthr., and copies the errors of Haw. and Warr., *albivena*.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 198 (1935), added *fagnouli*, Guth., and *anglica*, Obthr., as fresh forms, and from Heydemann's memoir *rufescens*, Tutt; *medio-sanguinea*, Hydmn.; *sulphurescens*, Hydmn. *ochrea*, Debauche; *lugens*, Obthr.; *snelleni*, Rebel., and *virginalis*, Obthr.

Of the Variation Barrett said:—

Locally variable; in Ireland and the West of England the colour often becomes dark red-brown or black-brown, the white markings obscured, sometimes almost suppressed, even in some instances the white central spot being obliterated. On the other hand southern examples are often of a very light bright red.

The Names and Forms to be considered are:—

*myrtilli*, L. (1761), *Fn. S.*, 311.

[*snelleni*, Snell. (1862), *Tijd. v. Ent.*, V, 111, plt. V, 5] innom.

ssp. *acadiensis*, Beth. (1869), *Tr. N. Scotia Ins.*, II, 54. Amer.



- ab. *lugens*, Obthr. (1881), *Et. Comp.*, VI; Culot, *N. et G.*, I (2), 127 (1915).  
 ab. *virginalis*, Obthr. (1881), *l.c.*  
 race *anglica*, Obthr. (1881), *l.c.* Syn.?  
 ab. *olivacea*, Fuchs. (?), Warr.-Stz., *Pal. Noct.*, III, 252 (1911).  
 race *alpina*, Raetz. (1890), *Mitt. Schweiz. Ent. Ges.*, VIII, 224.  
 ab. *rufescens*, Tutt (1892), *Br. Noct.*, III, 129.  
 ab. *snelleni*, Rebel. (1909), *Berge.*, IXed., 263.  
 ab. *peralbata*, Warr.-Stz. (1911), *Pal. Noct.*, III, 252.  
 ab. *nigrescens*, Warr.-Stz., *l.c.*  
 ab. *citrina*, Warr.-Stz., *l.c.*  
 ab. *fagnouli*, Guth. (1928), *Arch. f. Ins. Oberrhein*, II, 251. Syn.  
 ab. *mediosanguinea*, Hydmn. (1929), *Int. E. Zt.*, XXII, 427.  
 ab. *sulphurescens*, Hydmn. (1929), *l.c.*  
 ab. *ochrea*, Debauch. (1929), *Lamb.*, XXIX, 66.  
 ab. *nordstroemi*, Dahl. (1930), *Ent.-Tidsk.*, LI, 25, fig.

Tutt dealt with the (1) typical form, dark blackish or purplish-red form; (2) our common red form, the variety *rufescens*; (3) the *albirena*, of Haw., with the ground colour brown (*fuscae*). Tutt put the ab. *albirena* down to Haw., but Haw. said it was the insect figured by Hb. on his plate 21, fig. 99, as a species separate from *myrtilli*. It is a form of *cordigera*, cf. the fig. 674-5 Hb. named *cordigera*, Thunbg. Also see Culot, *N. et G.*, I (2), 127.

*ssp. acadiensis*, Beth., Jr. *Nov. Scot. Ins. N.S.*, II, 54 (1869) [*Can. Ent.*, II, 54 (1869)].

ORIG. DESCRIP.—“Anterior wings dull brick-red, sparsely powdered with black scales. Basal line indistinct, doubled, slightly dentate, black; transverse anterior line black, perpendicular to costa for nearly half its length, then curved outwards forming an irregular arc to the inner margin. Median space darker, with a transverse central black shade; orbicular spot very conspicuous creamy-white, with a few scattered ferruginous scales in the middle, narrowed posteriorly and produced till it meets the edge of the reniform; this spot is of the normal shape, concolorous with the rest of the wing, conspicuously bordered with white, except inferiorly where it is open and encroached upon by the dark central shade. Transverse posterior line, black, fine, forming a very convex arc outside of the reniform spot. Subterminal and terminal spaces paler; subterminal line rather broad, distinct, black, arising from a triangular spot on the costa, slightly wavy, parallel to the outer margin; terminal line deep black, very distinct; fringes unicolorous with the wing. Posterior wings shiny, straw-yellow, with a broad, well-defined black border, which is slightly excavated interiorly just before the anal angle; costa, base, and inner margin broadly discoloured with black scales; fringes yellow at apex, pale yellow inferiorly.”

ab. *lugens*, Obthr. (Culot), *N. et G.*, I (2), 126 (1915); *Et. d'Ent.*, VI, plt. 131 (1881).

ORIG. DESCRIP.—“A Berlin form in which the basal yellow portion of the lower wing is very reduced: while the forewings are those of typical *myrtilli*.

ab. *virginalis*, Obthr. (Culot), *N. et G.*, I (2), 126, plt. 63, 4 (1915) [*Et. d'Ent.*, VI, 90 (1881)].

FIG.—*l.c.*, plt. 64, f. 4 (the type example).

ORIG. DESCRIP.—“In which the basal half of the hindwing is of a pure white.”

Culot, *N. et G.*, I (2), 126, deals with the forms which Oberthür had described in *Etud. d'Ent.*, VI, 90 (1881).

race *anglica*, Obth., *N. et G.*, I (2), 126 (1915) [*Et. d'Ent.*, VI (1881)].

ORIG. DESCRIP.—“An English form with forewings more unicolorous, of a ruddy-brown, which descriptively appears to me to be that of the typical *myrtilli*. In *anglica* the white markings are very attenuated and only the discoidal white spot remains clearly.”

Hamps., *Cat. Lep. Ph.*, V, 43 (1905). “Forewing obscure red-brown, with the markings almost obsolete; hindwing with the orange reduced.” Germany, Switzerland, Spain.

race *alpina*, Raetzer, *Mitt. Schweiz. Ent. Ges.*, VIII, 224 (1890).

The author gives the name *alpina* to the alpine race described in Frey's *Lep. der. Schweiz.* as follows:—“The forewing dark chocolate-brown without paler dusting.”

ab. *olivacea*, Fuchs., details are apparently unknown as well as date. Taken along the German Rhine.

DESCRIP.—Seitz, *Pal. Noct.*, III, 252 (1911). “The yellow of the hindwing is suffused with olive-brown, while the coloration of the forewing remains of the normal bright red.”

ab. *snelleni*, Rbl., *Berge.*, IXed. 263 (1909).

FIGS.—*Tijd.*, V, p. 111, plt. V, 5 (1862), Snellen. innom.

ORIG. DESCRIP.—“Hindwings completely black.” Rebel. (1909).

ab. 1. Hamp., *Lep. Phal.*, V, 43 (1905).

ORIG. DESCRIP.—“Head, thorax, and forewings with the red almost entirely replaced by black.” Hyères.

ab. *nigrescens*, Warr.-Stz.—Hampson's ab. 1 was named in Seitz, *Pal. Noct.*, III, 252 (1911). “The usual red suffusion is almost entirely replaced by black.”

ab. *peralbata*, Warr.-Stz., *Pal. Noct.*, III, 252 (1911).

FIG.—*l.c.*, plt., 50b.

ORIG. DESCRIP.—“Is an extreme form, in which the white lines are strongly developed, and the central area is milk white from costa to inner margin, including the white blotch on vein 2; in the hindwing the yellow is ampler; the black of the costa and inner margins and the basal suffusion being reduced.”

ssp. *citrina*, Warr.-Stz., *Pal. Noct.*, III, 252 (1911).

FIG.—*l.c.*, 50c.

ORIG. DESCRIP.—“The whole forewing is suffused with blackish, having only the white blotch on vein 2 conspicuous, and the orange of the hindwing, both above and below, is pale lemon-yellow; as the insect is decidedly larger than average typical *myrtilli* it may prove a distinct species, only one known.” Cintra, Portugal.

ab. *mediosanguinea*, Hydmn., *Int. Ent. Zt.*, XXII, No. 46, p. 427 (1929).

FIG.—*l.c.*, plt., fig. 5.

ORIG. DESCRIP.—“The whole of the central area is devoid of all white marking and is of a deep and uniform blood-red tone, and only the two containing lines are white. All other white and yellowish markings are obliterated by the red, so that only the four white transverse lines remain on a red ground.” S. Holstein.

ab. *sulphurescens*, Hydmn., *Int. Ent. Zt.*, XXII, No. 44, p. 427 (1929).

FIG.—*l.c.*, f. 6.

ORIG. DESCRIP.—“All the red and olive-yellow has become sulphur-yellow. The forewings are black as in the typical form, strongly bestrewn with sulphur-yellow scales, which in the basal area are clear golden-yellow. The central spot is reduced, white. The transverse lines enclosing the central area are black, on the outer side margined finely with white, the margining of the reniform is the same, which is filled in yellowish. The veins in the marginal area as well as the waved line are white. Thorax and collar black and sulphur-yellow haired. The abdominal tuft, as also the underside, yellow, similarly all the wings on the underside which usually have red-coloured streaks, are clear sulphur-yellow. On the lower wings the normal yellow colour touches the broadened black border area and the veins in the basal portion are black powdered.”

ab. *ochrea*, Debau., *Lamb.*, XXIX, 66 (1929).

ORIG. DESCRIP.—“*Alis anticis ochraceis nec rufescentibus alboque variegatis.* The anterior wings are yellow ochre, the black markings are well developed there. Besides the white discoidal spot, one sees in the median area some white spots irregularly spread.” Cortenburg.

ab. *nordstroemi*, Dahl., *Ent. Tidsk.*, LI, 251, fig. (1930).

ORIG. DESCRIP.—“Central part of the forewings very dark and without a trace of the white spot, which is present in the type form. The inner transverse line is darkened and invisible. The outer transverse line and the subterminal line on the contrary are clear. Resembles ab. *mediosanguinea*, Hydmn., but goes a step further in the melanic direction.” ♂, Sweden.

#### ANARTA CORDIGERA, Thnbg.

*Anarta*, Treit. (1826), used by nearly all authors [*Melanchra*, auct., was used by Meyr. only] *cordigera*, Thnbg. (1788).

Tutt, *Brit. Noct.*, III, 129 (1892): Meyr., *Handb.*, 87 (1895): Barr., *Lep. Br. Is.*, VI, 223, plt. 250, 3 (1900): Stdgr., *Cat.*, IIIed., 218 (1901): Hamp., *Lep. Phal.*, V, 43 (1905): Splr., *Schm. Eur.*, I, 277, plt. 50, 20 (1907): South, *M.B.I.*, II, 45, plt. 17, 7 (1908): Warr.-Stz., *Pal. Noct.*, III, 253, plt. 50c (1911): Culot, *N. et G.*, I (2), 107, plt. 63, 5 (1915): Meyr., *Rev. Hb.*, 159 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 198 (1935).



Esp., *Abbild. Noct.*, IV, 2 (2), p. 32, plt. 189, 2 (1790??), gave a figure.

Hb., *Noct.* (1800-3), f. 99, gave a figure of a dark form of this species under the name *albirena* and again later (1818-22) he gave an excellent figure 674, with the name *cordigera*.

Dup., *Hist. Nat.*, VII (1), 289, plt. 118, 2 (1827), gave an excellent figure.

H.-S., *Sys. Bearb.*, II, 371 (1851), said of Hb. 99 too "grell," harsh, hard, glaring.

Stdgr., *Cut.*, 1901, called *albirena* a syn. of *cordigera*, gave the ab. *aethiops*, Hoffm. (al. ant. fere totis nigris, macula reniforme alba) and the ab. *carbonaria*, Chr. (al. ant. supra ut in ab. praec., subt. flavis nigro-marginatis).

Hamp., *Lep. Phal.*, V, 43 (1905), accepted ab. *aethiops* and ab. *carbonaria* and gave *albirena*, Hb., *luteola* Grote & Roh., and *suffusa*, Tutt, as synonyms.

Splr., *Schm. Eur.*, I, 277, plt. L, 20 (1907), gave a much variegated form, which he said was the ab. *variegata*, Tutt, and went on to describe *aethiops*, Hoffm.

South, *M.B.I.*, II, 45, plt. 17, 7 (1908), gave a nice figure of a British form and referred to the ab. *aethiops*, Hoffm., as being the same as ab. *suffusa*, Tutt, and to the ab. *variegata*, Tutt.

Warr.-Stz., *Pal. Noct.*, III, 253, plt. 50c (1911), gave two good figures, one a typical form and the other a *suffusa* form but unusually small. They dealt with *variegata*, Tutt, *suffusa*, Tutt, *aethiops*, Hoffm., and *carbonaria*, Christ. They treated *albirena*, Hb., and *luteola*, Grote, Robinson, as syns.

Culot, *N. et G.*, I (2), 127, plt. 63, 5 (1915), gave an excellent figure, and referred to *albirena* as a syn. and *aethiops* an ab.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 198 (1935), added *aureola*, Stich., "belongs to the form *suffusa*."

Of the Variation Barrett said:—

"Usually quite constant in colour and markings, but in the collection of Mr W. H. B. Fletcher is a specimen in which the white spot of the forewings is enlarged and spread over the central band."

The Forms and Names to be considered:—

*cordigera*, Thunbg. (1788), *Mus. Nat. Up. Diss.*, 72, plt. VI, 4.

*albirena*, Hb. (1800-3), *Smml. Noct.*, 99 (quoted by Haw. to *myrtilli*).  
ssp. *luteola*, Grote & Robinson (1865), *Proc. Ent. Soc. Phil.*, IV, 493,  
plt. III, 5-6. Amer.

ab. *variegata*, Tutt (1892), *Brit. Noct.*, III, 130.

ab. *suffusa*, Tutt (1892), *l.c.*

ab. *aethiops*, Hoffmn. (1893), *Stett. e. Ztg.*, 123.

ab. *carbonaria*, Christ. (1893), *Iris*, VI, 92.

ab. *aureola*, Stich. (1908) [Drdt.-Stz., *Pal. Noct. Supp.*, III, 198 (1935)].

Tutt dealt with: (1) Thunberg's type, i.e., the common Scotch form with white point to band; (2) ab. *variegata*, with the black band broken; and (3) ab. *suffusa*, the rare very black suffused form.

f. *albirena*, Hb., f. 99 (1800-3).

DESCRIP.—A very dark form with markings not emphasized with white.

ssp. or race *luteola*, Grote & Robinson, *Proc. Ent. Soc. Phil.*, IV, 493 (1865).

FIG.—Plt. III, f. 5, 6

ORIG. DESCRIP.—Appears to represent the European *cordigera*. “Basal space large; basal line oblique, black; transverse anterior line nearly straight, slightly dentate. Median space black, especially inferiorly—while showing a brownish shade centrally and superiorly; orbicular spot concolorous with the median space, with an encircling black line, moderate, of the normal shape, reniform large prominent, whitish very distinctly contrasted with the dark squamation of the rest of the wing, of the normal shape. Transverse anterior line projected superiorly outside of the reniform spot, making the median space wide above, and approaching the transverse anterior line below the median vein. Subterminal and terminal spaces powdered with greyish scales; subterminal line black, irregular; fringes blackish, interrupted very narrowly with pale hairs at the extremity of the nervules. Posterior wings clear yellow, with a broad neatly defined black border, equally wide; fringes pale. Under surface of both wings blackish, largely covered with yellow scales on the disc; the latter colour on the posterior pair covers the entire surface of the wing and internal margin as on the upper pair.”

ab. *aethiops*, Hoffm., *Stett. e. Ztg.*, 128 (1893).

ORIG. DESCRIP.—“The North Finnish *A. cordigera*, which are characterised by their deep black colour, are quite attributable to var. *aethiops* (Stdgr. *in lit.*) which I have also obtained from the Shetland Isles. The species flew at the beginning of July pretty commonly at Kunsamo. From the middle of July I saw it no more, but I took on August 10th a quite fresh example, so that the possibility of a second generation is suggested, unless a very protracted emergence is natural.”

Hamps., *Cat. Lep. Ph.*, V, 44 (1905), “Forewing almost entirely black except the reniform stigma.”

var. *carbonaria*, Christ., *Iris*, VI, 92 (1893).

ORIG. DESCRIP.—“Forewings almost wholly black, the reniform spot narrower; the fascia of the hindwings with a narrower margin; wings yellow below with wide black margins.” Vilni.

Hamps., *Cat. Lep. Ph.*, V, 44 (1905), “Like *aethiops*, but the underside of forewing yellow with the marginal areas dark.” S.E. Siberia.

f. *aureola*, Stich., *Berl. Ent. Zt.*, LIII, 107 (1908).

DESCRIP.—*Drdt.-Stz. Supp.*, III, 198 (1935).

“Belongs to the form *suffusa*, Tutt, but has an ochreous-yellow instead of white, reniform stigma.”

#### ANARTA MELANOPA, Thnbg.

*Anarta*, Tr. (1826), used by nearly all authors [*Melanchra*, auct., was used by Meyr. only] *melanopa*, Thnbg. (1791).

Tutt, *Brit. Noct.*, III, 130 (1892): Meyr., *Handb.*, 87 (1895): Barr., *Lep. Brit. Is.*, VI, 219, plt. 250, 2 (1900): Stdgr., *Cat.*, IIIed., 218 (1901): Hamp., *Lep. Phal.*, V, 45 (1905): Splr., *Schm. Eur.*, I, 277, 50, 22 (1907): South, *M.B.I.*, II, 44, plt. 20, 1 (1908): Warr.-Stz., *Pal. Noct.*, III, 253, plt. 50c. (1911): Culot, *N. et G.*, I (2), 127, plt. 63, 8-9 (1915): Meyr., *Rev. Handb.*, 159 (1928).

Hb., *Samml. Noct.*, gave good figures of the forms *vidua*, 403 (1808), *tristis*, 446 (1808-9), and *rupestris*, 644-5 (1818-21). *rupestris* was first figured by Hb. under the name *rupestralis* as a Pyralid (1799) and subsequently again figured under the name *rupestris* (1818-21).

Treit., *Schmett.*, V (3), 207 (1827), based his consideration on Hb.'s work. He took *vidua*, Hb. 403, as the species, and *tristis*, Hb. 446, and *rupestris*, Hb. 644-5, as varieties.

Dup., *Hist. Nat.*, VII, 297, plt. 118, 6 (1827), gave an excellent figure under the name *tristis*, Hb., with which he associated *vidua*, Tr., and *rupestris*, Hb., as varieties.

Fr., *Neu. Beitr.*, IV, 36, plt. 311, figs. 2-3 (1842), gave two extremely good figures of (1) a normal form and (2) an extreme aberration suffused almost entirely with black.

H.-S., *Sys. Bearb.*, II, 372, figs. 433-434 (1851), gave two very good figures, upper and underside. He said it was an example with a well marked white hindwing and with scattered white on the forewings. He considered Fr., 311, 2, was bad. *vidua*, Hb. 403, was recognizable, but forewings too wide: *tristis*, Hb. 446, bad; body too slender, wing too broad. *rupestris*, Hb. 644, 645, a very dark example, forewing too wide and pointed.

Gn., *Hist. Nat.*, VI, 190 (1852), discussed the *melanopa*, Thnb., with which he associated *vidua*, Tr., *rupestris*, and *tristis*. He treated the *vidua*, Hb. (nec Tr.), as a good species.

Stdgr., *Cat.*, IIIed., p. 218 (1901), gave *alpicola*: Quens., *vidua*, Hb., and ab. *nigrolunata*, Pack., as syns.; ab. *wiströmi*, Lampa, and v. *rupestralis*, Hb. (Pyral). The last = *tristis*, Hb. = *rupestris*, Hb.

Hamp., *Lep. Phal.*, V, 45 (1905), gave the usual synonyms and the two abs. *wiströmi* and *rupestralis*.

Splr., *Schmett. Eur.*, I, 277, plt. 50, 22 (1907), gave a very good figure near the form *rupestralis*, Hb., and discussed the variation with reference to *wiströmi* and *rupestralis*. This insect was placed by early authors among the Pyrales, e.g., Hb.

South, *M.B.I.*, II, 45, plt. 17, f. 5-6 (1908), gave two very good figures, ♂ and ♀, of the greyish typical form. He referred to the brownish form *wiströmi*, Lampa, and to ab. *rupestralis*, Hb., with the hindwings fuscous grey, while the forewings are almost normal.

Warr.-Stz., *Pal. Noct.*, III, 253, plt. 50c (1911), gave five good figures, ♂ and ♀ *melanopa*; typical, ♂ and ♀ *vidua*, and *rupestralis*. They treated *alpicola*, Quens., and *nigrolunata*, Pack., as varieties, and gave ab. *wiströmi*, Lampa, ab. *rupestralis*, Hb. (= *tristis*, Hb.), and *rupestris*, Hb., as syns.

Culot, *N. et G.*, I (2), 127 plt. 63, 8-9 (1915), gave two excellent figures. 8, a Scotch example of the typical form, and 9, the *rupestralis*, Hb., form from Zermatt. He then discussed the relationship of several nearly allied species to *melanopa*. He considered ab. *wiströmi*, as an



extreme northern and high alpine form, and treated *vidua*, Hb., as an intermediate between *wiströmi* and *rupestralis*.

Of the Variation Barrett said:—

There is some variation in the ground colour from greyish-white to grey-black, and in the Shetland Isles to very pale yellow. In the collection of Mr S. J. Capper is a specimen with blacker forewings and the blackness on the hindwings so extended as to leave only a small yellowish-white central spot preceded by a similar streak. An extremely neat and pretty dark form

The Names and Forms to be considered:—

- melanopa*, Thnbg. (1791), *Diss. Ent. Sist.*, (2), 42.  
 ab. *rupestralis*, Hb. (1799), *Samml. Pyral.*, 138.  
*alpicola*, Quens. (1802), *Acerbi.*, II, 253, pl. I, 5-6. Syn.  
 f. *vidua*, Hb. (1808), *Samml. Noct.*, 403.  
*tristis*, Hb. (1809), *l.c.*, 446. Syn.  
*rupestris*, Hb. (1818-21), *l.c.*, 644-5. Syn.  
*nigrolunata*, Pack. (1865-7), *Labr.*, 40. Syn.  
 ab. *wiströmi*, Lamp. (1885), *Ent. Tids.*, 81.  
*brunnea*, Robs. (1887), *Young. Nat.*, VIII, 122.

Tutt dealt with: (1) the typical form of Thnbg., grey irrorated, with white hindwings and black marginal band and lunule; (2) ab. *wiströmi*. Lampa, much darker towards yellowish-brown; (3) *vidua*, the form with dark forewings and entirely black hindwings; and (4) *rupestralis*, with forewings normal and hindwings black.

race *nigrolunata*, Pack., *Proc. Boston Soc. N.H.*, XI, 40 (1866-7).

ORIG. DESCIP.—“Of the usual dusky cinereous colour, with black and white scales. Abdomen darker and usual. Palpi stout, ascending, passing as usual beyond the front, beneath paler. Forewing with a black costal spot at base, and beyond an oblique black line directed inwards to the median nervure. An inner round discal black spot, with one beneath, and a third narrower one on the inner margin. The reniform dot is very large, black, distinct, dilating on the lower lobe; beyond is a sinuate line of black dots; a submarginal, diffuse, sinuate, zigzag line within, extending on the costa to the line of black dots; margin clear grey, fringe dusky, interrupted with narrow white streaks. Hindwings black, with the middle white; the black base reaches to, and partially includes, the large, broad, discal, regular, lunate spot, and broadly lines the inner edge, and also the margin. Fringe white.

“Beneath whitish, with the reniform dot present on the forewings, and the distal dot on the hindwings large, black, appearing distinct on the white wings. Dusky towards the base, the black extending also on to the costa and inner margin. A rather broad, dusky submarginal line on the forewings, which is doubled on the costa. A marginal row of internervural black lines. Fringe dusky, with white streaks. Hindwings with a broad blackish margin; fringes white.” Labrador.

Hamp., *l.c.*, gave these short descriptions:—

ab. *wiströmi*.—Forewing without grey irroration, the underside with dark terminal band.

ab. *rupestralis*.—Hindwing entirely or almost entirely suffused with fuscous.

ab. *brunnea*, Gregs. (Robson), *Young Nat.*, IX, 123 (1888).

ORIG. DESCRIP.—“A browner form with four dark bands, showing the veins lighter.”

#### HELIACA TENEBRATA, Scop.

*Heliaca*, H.-S. (1851), Dup., South, Culot: [*Panemeria*, Hb. (1823) Meyr., Hamp., Splr., Warr., Meyr., Drdt.: *Anarta*, Tr. (1826), Dup., Frr., Stdgr.: *Heliothis*, Dup. (1826), Gn.: *Parhemeria*, Splr. (emend), *tenebrata*, Scop. (1763).

Tutt, *Brit. Noct.*, III, 132 (1892): Meyr., *Handb.*, 167 (1895): Barr., *Lep. Br. Is.*, VI, 169, plt. 246, 1 (1900): Stdgr., *Cat.*, IIIed., 220 (1901): Splr., *Schm. Eur.*, I, 279, plt. 50, 30 (1907): South, *M.B.I.*, II, 46, plt. 17, 3-4 (1908): Warr.-Stz., *Pal. Noct.*, III, 258, plt. 50g (1911): Culot, *N. et G.*, I (2), 131, plt. 63, 17 (1915): Meyr., *Rev. Handb.*, 68 (1928): Drdt., *Pal. Noct. Supp.*, III, 201 (1935).

Esp., *Abbild. Noct.*, IV (1), 555, plt. CLXIII, 1 (1790+), gave a figure with the name *fasciola* which Wernb. said is *tenebrata*, Scop. (*heliaca*, Tr.). In the text Esp. gave the name *arbuti*, F.

Ernst & Engram., *Pap. d'Eur.*, VII, 156, figs. 606a, b, c (1793), gave three figures which have been attributed to this species. They called it “La polynome,” as then in 1793 it already had five names. They give nineteen references in their list more than 30 years before that of Treit.

Hb., *Samml. Noct.*, 316 (1800-3), gave a good figure under the name of *heliaca*, but much too large.

Tr., *Schm. Noct.*, V (3), 212 (1826), treated this species under the name *heliaca*, Hb., and gave a very full list of references to the names which had been used for this species by different authors: *arbuti*, Fab., *Ent. Sys.*, III (2): *fasciola* (*arbuti*), Esp., *Abbild.*, IV: *policula*, Lang., *Verz.*: *domestica*, Hufn., *Berl. Mag.*, III, etc., nineteen in all.

Dup., *Hist. Nat.*, VII (1), 293, plt. 118, 4 (1827), gave a good figure under the name *heliaca*, Hb., and recorded the syns. *arbuti*, *fasciola*, *policula*, *domestica*, etc. In his *Cat.* (1844), p. 171, he used the name *arbuti* and the genus name *Heliodes*, Gn., in place of *Anarta*.

Frr., *Beitrag*, III, 84, plt. 119 (1830), gave a very good figure under the name *heliaca*.

H.-S., *Sys. Bearb.*, II, 370 (1851), treated *jocosa* as a good species, used the name *arbuti*, F., and established the genus *Heliaca*, discarding *Heliothis*, Dup., and *Anarta*, Tr., for these two species. Listed the usual syns.

Gn., *Hist. Nat. Noct.*, VII (2), 197 (1852), treated *heliaca*, *fasciola*, *policula*, and *domestica* as syns. He also considered Ernst & Engram., *Pap. d'Eur.*, 606a, b, were figures of this species. He treated *jocosa*, H.-S., as a species.

Stdgr., *Cat.*, IIIed., 220 (1901), gave a ssp. *jocosa*, Z., which is now considered a species, with *arbutoides*, Bell., a syn., and *heliaca*, Hb., as a syn. of *tenebrata*.



Splr., *Schm. Eur.*, I, 279, 50, 30 (1907), gave a good figure and described an ab. *obscura* with wider band on the hind margin and hindwing with a minimum of yellow ground. He referred to a specimen with white ground of hindwing.

South, *M.B.I.*, II, 46, plt. 17, 3-4 (1908), gave two good figures.

Hamp., *Lep. Phal.*, IX, 488, fig. 233 (1910). His figure was  $1\frac{1}{2}$  times the normal. He gave the usual syns. and no aberrations; he removed it far from the group of species with which it had hitherto been associated.

Warr.-Stz., *Pal. Noct.*, III, 258, plt. 50g (1911), gave two good figures, typical and ab. *obscura*. They recognized one aberration, *obscura*, Splr., and listed as synonyms *arbuti*, Fab., *heliaca*, Schiff., *domestica*, Kuhn., *policula*, Lang., and *fasciola*, Esp.

Culot, *N. et G.*, I (2), 131, plt. 63, 17 (1915), gave an excellent figure of *tenebrata*, Scop. He admitted two forms, the *obscura*, Splr., and the *jocosa*, Zell.—the latter he thought had been considered a species in error.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 201 (1935), added the two new forms described by Dnhl. in 1933. ab. *satiata*, forewings a rich dark brown, all markings suppressed, no pale patch in central area. Tyrol; and ab. *flavescens*, which has, instead of an orange, a pale yellow central band to hindwings. Majella.

#### The Names and Forms to be considered:—

*tenebrata*, Scop. (1763), *Ent. Carn.*, 230.

*domestica*, Hufn. (1766), *Berlin Mag.*, III, 83. Syn.

*arbuti*, Fab. (1775), *Sys. Ent.*, 616. Syn.

*policula*, Lang. (1782), *Verz.*, 159. Syn.

*fasciola*, Esp. (1790+ ?), *Abbild. Noct.*, IV (1), 555, plt. CLXIII, 1. Syn.

*heliaca*, Hb. (1800-3), *Samml. Noct.*, 316. Syn.

*jocosa*, Zell. (1847), *Isis.*, 450. Sp.

*arbutoides*, Bell. (1860), *Ann. S. E. Fr.*, 694. Syn. to *jocosa*.

ab. *albescens*, Ckrll. (1889), *Ent.*, 126.

ab. *obscura*, Splr. (1907), *Schm. Eur.*, I, 279.

ab. *satiata*, Dnhl. (1933), *Ent. Zt.*, XLVII, 19.

ab. *flavescens*, Dnhl., l.c.

ab. *nigrescens*, Ckyne. (1944), *Ent. Record*, LVI, 56.

ab. *nigrescens*, Ckyne. (1944), *Ent. Rec.*, LVI, 56.

ORIG. DESCRIP.—“The yellow of the hindwings is replaced by blackish brown.” ♂. Chelmsford, Essex.

Tutt dealt with: (1) Scopoli's type; (2) took *jocosa* as an ab., but it is now considered a sp.; (3) treated *arbuti* as a syn.; (4) and accepted the *albescens*, Ckrll., as an ab.

Of the Variation Barrett said:—

“Hardly ever variable, but in the cabinet of Mr S. Stevens is a specimen in which the yellow hindwings are much suffused with black.”

The aberrations may be tabulated in a short way:—

ab. *albescens*, Ckrll.

DESCRIP.—With white in place of yellow on the hindwings.



ab. *obscura*, Splr.

DESCRIP.—With an unusually wide dark band on hindwing and basal patch, with a minimum of white in place of yellow.

ab. *satiata*, Dnhl.

DESCRIP.—A rich dark brown, with all markings suppressed, no pale central area.

ab. *flavescens*, Dnhl.

DESCRIP.—Has a very pale yellow instead of an orange yellow band on hindwing.

#### PACHNOBIA RUBRICOSA, Fb.

*Pachnobia*, Gn. (1852), Tutt, Barrett, Stdgr., Culot: *Mythimna*, Hb. (1821), Hamp.: *Triphaena*, Fr. (1825), Meyr., Meyr.: *Orthosia*, Tr. (1825), H.-S.: *Cerastis*, Tr. (1825), Frr., Warr.-Stz., Strand, Drdt.-Stz.: *Glaea*, Steph. (1829), Dup.: *Taeniocampa*, Gn. (1852), Gn.: *Sora*, Heine. (1859), Splr.

Tutt, *Brit. Noct.*, II, 130 (1892): Meyr., *Handb.*, 107 (1895): Barr., *Lep. Br. I.*, V, 22b, plt. 214, 2 (1899): Stdgr., *Cat.*, IIIed., 153 (1901): Hamp., *Lep. Phal.*, IV, 605, fig. 10b (1903): Splr., *Schmett. Eur.*, I, 165 (1905): South, *M.B.I.*, I, 32b, plt. 155, 5-6 (1907): Warr.-Stz., *Pal. Noct.*, III, 60, plt. 14b (1909): Culot, *N. et G.*, I (1), 94, plt. 15, f. 17 (1911): Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 88 (1934).

Rosel., *Ins. belust.*, Vol. IV, 145, plt. 21, 1-3 (1761), gave an unnamed crude figure, which is considered to be *rubricosa*.

Schiff., *Verz.*, 77, M. 4 (1775), gave the name *rubricosa* to a Noctuid with blackish dots on the outer margin, but not an adequate description or specific indication. The first description was that of Fab. in 1787, quoted by Tutt.

Esp., *Abbild. Noct.*, IV, 483, plt. 148, 4 (1792+), gave a dull purplish figure with a rather blue-slaty tinge, the costa being clearly banded, along the margin several black dots. Not a good fig., the markings are far from delicate enough. Werneb. and others take the figure for a form of *rubricosa*.

Brahm., *Ins.-Kalend.*, II, 193 (1791), described under the name *pili-cornis*, at extreme grey form of *rubricosa* which was bred from a captured larvae.

Ernst & Engramelle, *Pap. d'Europ.*, VII, 151, fig. 513 (1792), gave a figure, which in the text is named *erythrocephala*, but which is a form of *rubricosa* according to Werneb. and others. 513c is a rather good figure of the typical form, with dark red-brown and dark grey, but 513a has considerable area of rather rich red-brown with well contrasting blue-grey area. The costal markings seem conclusive as to identity.

Bork., *Naturg. Noct.*, IV, 532 (1792), redescribed *rubricosa*, Fb., and gave references to Villers, *Ent. Linn.*, IV, 486 (1787): Schiff., *Verz.*, 77, M. 4 (1775): Göze, *Beitr.*, III (3), 213 (1781).

Illiger, *Verz.*, IIed., 239 (1801), gave the description made by Fab., which had already been copied by Villers, *Ent. Linn.*, and noted by Göze (*Beitrage*), together with a reference to Bork., IV, 532.

Haw., *Lep. Brit.*, 232 (1809), described an insect which he named *rufa*. It is a *rubricosa* form with red-brown wings and a paler costa half-way along with more or less obscure markings.

Hüb., *Samml. Noct.*, 509 (1809-13), figured under the name *mista*, a form with costa very slightly pale in part but with the usual dots joined on to the overwhelming dark rusty-brown general surface with markings only slightly visible. Hb. previously (1808-9) had given a figure of *rubricosa* of a more typical form with marking fairly exhibited.

Tr., *Schmett. Eur.*, V (2), 396 (1825), included Schiff. as the prior author of the name *rubricosa*. His description of the species is one of the best to date.

Dup., *Hist. Nat.*, VI, 99, plt. LXXIX, 4 (1826), gave a very dark red-brown figure with scarcely a trace of the bluish-grey on the costa or around the markings which are very obscure. It is difficult to pick out the figure from other figures on the plate. He referred to the *rubriconde* of Oliv., *Encylo.*

Frr., *Beitr.*, III, 79, plt. 117 (1830), said that Esper's figure of this species both in marking and colour, as usual, was failure, but Hübner's figures of the two forms were good.

Gn., *Hist. Nat. Noct.*, V = 1, 349, considered Bork. had described it three times and remarked that possibly he had never seen the species.

Meyr., *Hand.*, 107 (1895), used the genus *Triphaena*, and again in the *Rev. Hand.*, 112 (1928).

Tutt pointed out that Gn., *Noct.*, V, p. 350, took as type a specimen of grey colour mixed with violet.

Hamp., *Lep. Phal. Noct.*, IV, 605, fig. 106 (1903), gave a b. and w. figure with mosaic marking all over the forewings, quite unrecognizable from all known figures and quite out of agreement with the text of the description. If correct as an actual specimen, certainly "*euvariegata*." He acknowledges *mucida*, Esp., *pilicornis*, Brahm., *rufa*, Haw., and *mista*, Hb.

Splr., *Schmett. Eur.*, I, 165, plt. XLV, 14 (1905), gave a very good figure with the bluish suffusion very effective without being emphasized. He referred to Esper's fig. *mucida* purple red and a more distinct grey marking, ab. *rufa*, Haw., of S. England, and to ab. *pilicornis*, Brahm., ashy-grey with reddish sheen and brown cross lines.

South, *M.B.I.*, I, 326, plt. 155, figs. 5-6 (1907), gave a fairly good figure 5, but 6 is, to us, quite unrecognizable. I have never seen a similarly coloured example; it has no feature in colour or marking indicative of *rubricosa*.

Warr.-Seitz, *Pal. Noct.*, III, 60, included f. *rufa*, Haw., r. *mucida*, Esp., dark purplish-red; f. *pilicornis*, Brahm., with red almost obliterated by grey suffusion; ab. *pallida*, Tutt, extremely pale, and f. *mista*, Hb., brick-red, costa, cross lines and outer margin grey. They gave two figs., a typical and ab. *rufa*, plt. 14b.

Culot, *N. et G.*, I (1), 94, plt. 15, 17 (1911), gave an excellent figure with not too emphasized marking. He mentioned ab. *rufa*, Haw.

Of the Variation Barrett wrote:—

"Variation in this species seems almost confined to the degree of intensity of the colour of the forewings, occasional specimens in the South and East of England being of a light purple-red or purplish-pink, while

others become purple-brown, and sometimes almost dark purplish-grey from excess of the ashy-grey bloom; from Dumbartonshire specimens sent by Mr J. R. Malloch are of an extremely dark greyish-purple, almost exactly the colour of *Noctua sobrina*. Examples almost equally dark and with one-half the wing silvered with ashy-grey bloom have been taken in the North of Ireland."

The Name and Forms to be considered:—

- rubricosa*, Schiff. (1775), *Verz.*, 77, M. 4. No description.  
*rubricosa*, Fb. (1787), *Mantissa*, II, 170.  
ab. *pilicornis*, Brahm. (1791), *Ins. Kalend.*, II, 193.  
f. *mucida*, Esp. (1792), *Schm. Abbild.*, IV, 482, plt. 148; 4.  
ab. *rufa*, Haw. (1809), *Lep. Brit.*, 237.  
f. *mista*, Hb. (1809-13), *Samml. Noct.*, 509.  
f. *pallida*, Tutt (1892), *Brit. Noct.*  
ssp. *norvegica*, Strand (1906), *Zool.-centralblatt* [Corti-Drdt.-Stz., *Pal. Noct. Suppl.*, III, 88 (1933)].

Tutt dealt (1) with the typical forms as described by Fab., *Mantissa*, II, 176 (1787), reddish-brown; (2) reddish-grey var. *pallida*; (3) ab. *rufa*, Haw., bright red; (4) f. *mista*, Hb., reddish-brown, with slaty costa and transverse lines; (5) dull purplish with slaty tinge f. *mucida*, Esp.; and (6) slaty-grey var. *pilicornis*, Brahm.

ssp. *norvegica*, Strand, *Zool.-centralb.*, 1906 [Corti-Drdt.-Seitz, *Pal. Noct. Suppl.*, III, 88, 1933].

DESCRIPTION:—"Denotes small (wing expanse: 32 mm.) specimens of grey-black ground-colour without red admixture and with very distinct orbicular stigma." Norway.

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# SPECIAL INDEX.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.Z.S., F.R.E.S.

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## The Entomologist's Record and Journal of Variation.

The names in this Index are placed alphabetically under specific names. In some cases species have been referred to under more than one name; e.g., the names, *Scopelosoma satellitia*, Linn. 1767, and *Eupsilia transversa*, Hufn. 1766, represent one and the same species: in such cases the page-references are given against the more correct name, with cross-references to synonyms.

The terms "var." and "ab." are used in Staudinger's sense, "f." (forma) indicating a form of which the exact status seems doubtful.

\* indicates a new name.

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